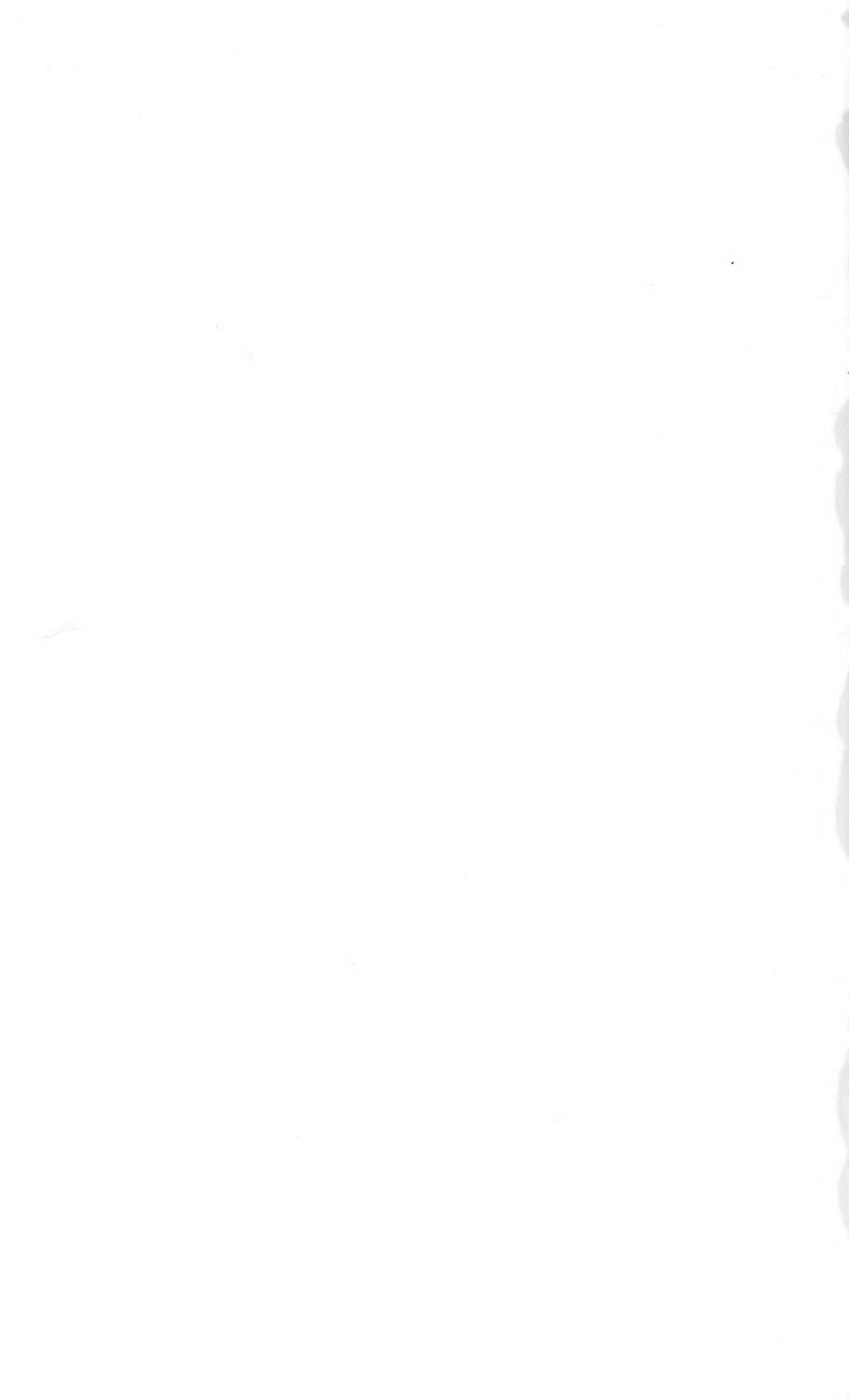






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Connecticut Agricultural Experiment Station

NEW HAVEN, CONN.

BULLETIN 209

DECEMBER, 1918

Fertilizer Report for 1918

By E. H. JENKINS, *Director, and*
E. MONROE BAILEY, *Chemist In*
Charge of the Analytical Laboratory.

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The Bulletins of this Station are mailed free to citizens of Connecticut who apply for them, and to others as far as the editions permit.

CONNECTICUT AGRICULTURAL EXPERIMENT STATION.

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December, 1918.

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Report on Commercial Fertilizers, 1918.

BY E. H. JENKINS, *Director*, and E. M. BAILEY,
Chemist in Charge of the Analytical Laboratory.

In 1918, forty-three individuals and firms entered 342 brands of fertilizers for sale in this State, classified as follows:

Nitrogenous superphosphates with potash.....	132
Nitrogenous superphosphates without potash.....	151
Bone manures and tankage.....	24
Fish, castor pomace, chemicals and miscellaneous.....	35
Total.....	342

During the spring months Mr. Churchill, the Station's agent, visited about 100 towns and villages in the State and gathered 466 samples. These represented all the registered brands except the following:

Alpha Portland Cement Co.'s Alpha Potash-Lime, American Agricultural Chemical Co.'s Grain and Seeding Fertilizer, Pulverized Sheep Manure, Top Dresser, 1916, Bradley's Tobacco Manure, 1916, East India Economizer Phosphate, 1916, Roanoke Phosphate, 1916, Tobacco Special, 1916, Unexcelled Fertilizer, 1916, Packers' Union Animal Corn Fertilizer, 1916, Potato Manure, 1916, Quinnipiac Wrapper Leaf Brand Tobacco Manure, 1916, Wheeler's Potato Manure, 1916, Williams & Clark's Matchless Fertilizer, 1916, Seed Leaf Tobacco Manure, 1916; Brown's Oats & Top Dressing; Essex Tobacco Manure; Fertile Chemical Co.'s Nitro-Fertile;† Frisbie's 4-8-2;‡ Lister's Ammoniated Dissolved Superphosphate, Complete Tobacco Manure, 1916, 1-8-2 Fertilizer, Success Fertilizer, 1916; Lowell High Grade 5-8; National Ammoniated Phosphate, 1916, Extra High Grade Potato Fertilizer, High Grade Top Dressing without Potash; New England H. G. Potato Fertilizer; Parmenter & Polsey's Special Tobacco & Onion Grower; Royster's Pipe of Peace Tobacco*

* A sample sent by manufacturer was analyzed.

† A sample sent by manufacturer was analyzed, also one sent by purchaser.

‡ A sample sent by purchaser was analyzed.

Fertilizer; Worcester Rendering Co.'s Royal Worcester Corn & Grain Fertilizer.

Of the 31 brands not found on sale, 16 were not sold in the state. Of the remaining 15 brands, 2 manufacturer's samples were analyzed and 1 purchaser's sample was examined.

CLASSIFICATION OF FERTILIZERS ANALYZED.

	Number of Samples
<i>1. Containing nitrogen as the chief active ingredient:</i>	
Nitrate of soda.....	7
Cotton-seed meal.....	56
Castor pomace.....	5
<i>2. Containing phosphoric acid as the chief active ingredient:</i>	
Basic lime phosphate.....	1
Precipitated bone phosphate.....	1
Acid phosphate.....	13
Barium phosphate.....	1
<i>3. Containing potash as the chief active ingredient:</i>	
Muriate of potash.....	6
Sulphate of potash.....	1
Kainit.....	1
Cotton-hull ashes.....	5
"Feldspar potash".....	1
Potash-Lime Fertilizer.....	1
<i>4. Containing nitrogen and phosphoric acid:</i>	
Fish manures.....	9
Slaughterhouse tankage.....	8
Mixed bone and tankage.....	1
Garbage tankage.....	1
Bone manures.....	20
<i>5. Mixed fertilizers:</i>	
Nitrogenous superphosphates.....	267
<i>6. Miscellaneous fertilizers and waste products:</i>	
Sheep manure.....	10
Rabbit manure.....	1
Bat guano.....	2
Wood ashes.....	21
Lime and limekiln ashes.....	4
Tobacco stems and dust.....	3
Lime-Fertile and Nitro-Fertile.....	4
Other miscellaneous materials.....	76
Total.....	526

I. RAW MATERIALS CHIEFLY VALUABLE FOR NITROGEN.

NITRATE OF SODA.

The nitrate sold in this State in 1918 has maintained the usual quality having an average content of 15.49 per cent. of nitrogen.

Seven samples were analyzed as follows:

10955. Sold by Berkshire Fertilizer Co., Bridgeport. Old stock of W. H. Burr, Westport.

10708. Sold by Nitrate Agencies Co., New York. Stock of A. G. Ross, Bridgeport.

10709. Sold by American Agricultural Chemical Co., New York. Stock of F. S. Bidwell Co., Windsor Locks.

10870. Sold by Apothecaries Hall Co., Waterbury, Sampled at Factory.

***9714 and 9715.** Stock of Brainard Nursery & Seed Co., Thompsonville.

10710. Sold by Sanderson Fertilizer & Chemical Co., New Haven. Sampled at Station Farm, Mt. Carmel.

ANALYSES OF NITRATE OF SODA.

Station No.....	10955	10708	10709	10870	9714	9715	10710
<i>Per cent. of</i>							
Nitrogen guaranteed	14.80	15.00	15.00	15.00	....	....	15.00
Nitrogen found.....	15.20	15.48	15.24	15.35	15.96	15.98	15.24
Cost per ton.....	\$67.66	100.00	100.00	113.00	....	....	....
<i>Nitrogen costs cents</i>							
per pound.....	22.3	32.3	32.8	36.8	....	....	....

Two of the samples contain at least one-half per cent. more nitrogen than is usually found in this article.

The price of **10955** is not a current price.

The market price of nitrogen in this form during the year has ranged from 32 to 37 cents and even higher.

COTTON SEED MEAL.

Only 56 samples of this material have been sent for analysis, a smaller number than in any other recent year. Of these analyses only those which failed to meet the claims of the seller, eleven in number, are given in table, page 127.

* Not sampled by station agent.

The percentage of nitrogen ranged from 5.12 to 7.02, the average of all samples being 5.98 per cent. The average cost per ton of the 56 samples was \$57.41 and in most cases represents deliveries in car lots.

Cotton seed meal contains about 2.9 per cent. of phosphoric acid and 1.9 per cent. of potash. If these are valued at 5 and 30 cents respectively,

the average cost of nitrogen in cotton seed meal in 1918 has been about 36 cents per pound.

The average figures for the last six years have been:

Year.	Number Analyzed.	Cost per Ton.	Per cent. Nitrogen.	Nitrogen Cost cents per Pound.
1913	315	\$33.00	6.89	20.7
1914	224	.....	6.77	21.6
1915	182	.....	6.96	19.9
1916	177	39.52	6.65	20.9
1917	95	44.20	6.10	26.5
1918	56	57.41	5.98	36.0

Much less unmixed cotton seed meal has been used as a fertilizer this year in this State. The reasons are several. It was sold on sight draft instead of arrival draft and buyers did not care to assume the risk of over charges in freight, loss from rough handling, etc.

Shortage of labor made the work of home mixing more difficult and led many to use only factory mixed fertilizers.

The higher price and lower content of nitrogen also lessened the demand and freight congestion made deliveries uncertain.

The steady deterioration in the quality of the meal is evident from the figures given above. It may be explained by the facts that because of the high price of cotton, the seed has been closely ginned to secure all the cotton possible, and where the seed is nearly "bald" the removal of the hulls is not so complete as where there is considerable fibre left on them.

It is also stated that the removal of oil is more complete where a larger amount of hull is left with the meal and, finally, there seems to be a tendency to reduce meal generally to a basis of 36 per cent. of protein (5.76 per cent. nitrogen).

At the time of writing, early December, 43 per cent. meal is quoted in *Kansas City* at \$67.00 which, with the usual allowance for phosphoric acid and potash, makes nitrogen cost over 38

COTTON SEED MEALS BELOW GUARANTY.

Station No.	Manufacturer or Jobber, Car No. or Marks.	Purchased, Sampled or Sent by	Per cent. Nitrogen.		Cost per ton.
			Found.	Guaranteed.	
11049	American Cotton Oil Co., N. Y.	T. C. Seymour, Windsor Locks...	5.50	5.75	\$53.56
10657	22401.....	Henry Fuller, Suffield.....	5.60	5.76	53.75
10854	43111.....	E. S. Seymour, Suffield.....	5.12	5.75	54.50
11047	182647.....	T. C. Seymour, Windsor Locks...	5.42	5.75	56.03
11048	36040.....	T. C. Seymour, Windsor Locks...	5.56	5.75	56.03
10654	H. L. Buss & Co., Boston.	Geo. S. Phelps & Co., Thompson- ville.....	5.43	5.75	57.50
10699	Rodney J. Hardy & Sons, Boston.	Geo. S. Phelps & Co., Thompson- ville.....	5.49	5.75	58.00
10940	Humphreys-Godwin Co. Memphis, Tenn.	H. C. Cone, Suffield.....	5.88	6.18	52.00
10937	4937, G. C. & T. F.....	H. C. Cone, Suffield.....	5.50	5.76	57.00
10935	48446 L. & W.....	H. C. Cone, Suffield.....	5.99	6.18	52.00
10944	Southern Cotton Oil Co., N. C.	Griffin Tob. Co., No. Bloomfield.	5.50	5.76	53.50

cents per pound at that point. 36 per cent. meal is quoted in Connecticut on the same date at \$64.00, making the cost of nitrogen about 43 cents.

CASTOR POMACE.

Five samples were analyzed as follows:

11053. Sold by Apothecaries Hall Co., Waterbury. Stock of W. J. Reeves, Windsorville.

10894. Sold by H. J. Baker & Bro., N. Y. Stock of Oliver Thrall, Windsor.

10864. Sold by A. L. Koster, Suffield. Stock of S. B. Warner, Windsor.

10776. Sold by Olds & Whipple, Hartford. Stock of F. S. Bidwell & Co., Windsor Locks.

11201. Sold by Olds & Whipple, Hartford. Sampled at factory.

10864 was found with no tags attached. The seller reported the nitrogen guaranty.

ANALYSES OF CASTOR POMACE.

Station No.....	11053	10894	10864	10776	11201
<i>Per cent. of</i>					
Nitrogen guaranteed..	4.52	4.52	4.52	4.50	5.00
Nitrogen found.....	5.28	4.64	5.10	4.70	4.90
Cost per ton.....	\$58.00	\$53.00	\$53.50	\$57.00	\$53.00

The average ton price of these five samples has been \$54.90. Their average nitrogen content has been 4.92.

Allowing 5 cents and 30 cents per pound respectively for the phosphoric acid and potash in them, the average cost of nitrogen has been not far from 48 cents per pound, the most expensive form of nitrogen.

The castor pomace situation is as follows: The castor beans formerly imported from India have all gone to England, the castor oil being greatly needed for the lubrication of aeroplane motors.

There has been a considerable production of castor beans in this country since our entry into war, but it has had no effect on the supply of pomace in New England.

II. RAW MATERIALS CHIEFLY VALUABLE FOR PHOSPHORIC ACID

BASIC LIME PHOSPHATE.

11052. Sold by American Agri. Chem. Co., N. Y. Stock of E. Dudley Bartlett, Guilford. Cost \$23.00 per ton. Guaranteed 13 per cent. "available" phosphoric acid, 14 per cent. total phosphoric acid. It contained

Water-soluble phosphoric acid.....	1.23
Citrate-soluble phosphoric acid.....	13.40
Citrate-insoluble phosphoric acid.....	1.45
Total phosphoric acid.....	16.06
"Available" phosphoric acid.....	14.63
Lime.....	28.30
Magnesia.....	0.89

"Available" phosphoric acid in this material costs 7.9 cents per pound.

PRECIPITATED BONE PHOSPHATE.

10997. Sold by Olds & Whipple, Hartford. Sampled at factory.
Cost \$48.35 per ton. It contained

Water-soluble phosphoric acid.....	2.02
Citrate-soluble phosphoric acid.....	28.20
Citrate-insoluble phosphoric acid.....	2.56
Total phosphoric acid.....	32.78
"Available" phosphoric acid.....	30.22

"Available" phosphoric acid in this material costs 8 cents per pound.

DISSOLVED ROCK PHOSPHATE OR ACID PHOSPHATE.

Thirteen samples were analyzed as follows:

10890. Sold by Nitrate Agencies Co., N. Y. Stock of A. G. Ross, Bridgeport.

10893. Sold by L. T. Frisbie Co., N. H. Sampled at factory.

11003. Sold by Wilcox Fertilizer Co., Mystic. Stock of M. E. Thompson, Ellington.

10777. Sold by American Agr. Chem. Co., N. Y. Stock of W. J. Lobdell, Stratford.

11018. Sold by Coe-Mortimer Co., N. Y. Stock of J. E. Stoddard, Abington.

11051. Sold by American Agr. Chem. Co., N. Y. Stock of E. H. Latimer, Southington.

10956. Sold by F. S. Royster Guano Co., Baltimore, Md. Stock of J. D. Kelsey & Son, Madison.

11020. Sold by Armour Fertilizer Works, Chrome, N. J. Stock of Quality Seed Store, Stamford.

10866. Sold by American Agr. Chem. Co., N. Y. Stock of Geo. S. Phelps & Co., Thompsonville.

10871. Sold by Apothecaries Hall Co., Waterbury. Sampled at factory.

11162. Sold by Armour Fertilizer Works, Chrome, N. J. Stock of Quality Seed Store, Stamford.

10833. Sold by Bowker Fertilizer Co., N. Y. Stock of W. B. Martin, Rockville.

10957. Sold by Coe-Mortimer Co., N. Y. Stock of Gunther Bros., Rockville.

ANALYSES OF ACID PHOSPHATE.

Station No.	Water-soluble phosphoric acid.	Citrate-soluble phosphoric acid.	Citrate-insoluble phosphoric acid.	Total phosphoric acid.	"Available" phosphoric acid found.	"Available" phosphoric acid guaranteed.	Cost per ton.	"Available" phosphoric acid cost cents per pound.
10890	13.56	2.78	0.47	16.81	16.34	16.0	\$21.00	6.4
10893	15.61	1.87	....	17.48	17.48	16.0	23.00	6.6
11003	15.70	2.85	0.23	18.78	18.55	15.5	27.00	7.3
10777	12.29	3.83	1.57	17.69	16.12	16.0	26.00	8.1
11018	12.12	4.09	1.27	17.48	16.21	16.0	27.00	8.3
11051	15.64	1.22	1.27	18.13	16.86	16.0	29.00	8.6
10956	13.40	3.25	0.79	17.44	16.65	16.0	29.00	8.7
11020	13.73	1.89	0.27	15.89	15.62	16.0	28.00	9.0
10866	10.15	4.16	1.36	15.67	14.31	14.0	26.00	9.1
10871	10.28	3.88	0.99	15.15	14.16	14.0	26.00	9.2
11162	14.03	1.51	0.19	15.73	15.54	16.0	30.00	9.7
10833	12.08	2.32	1.50	15.90	14.40	14.0	29.00	10.1
10957	9.85	4.23	1.07	15.15	14.08	14.0	.....	.....

Of these samples 11020 did not meet the guaranty, the deficiency in available phosphoric acid being 0.38 per cent.

Of the twelve samples with cash prices attached 9 are guaranteed 16 per cent. "available" and 3 are guaranteed 14 per cent.

The average cost of the former is \$26.33 and of the latter \$27.00.

On this basis available phosphoric acid in the higher grade has cost about 7.9 cents per pound and in the lower grade 9.4 cents.

BARIUM-PHOSPHATE.

11019. Sold by Witherbee, Sherman & Co., Port Henry, N. Y. Stock of Olds & Whipple, Hartford. Guaranteed 14 per cent. phosphoric acid. Cost \$18.00 per ton.

It contained 14.97 per cent. phosphoric acid, chiefly in insoluble forms.

III. RAW MATERIALS OF HIGH GRADE
CONTAINING POTASH.

MURIATE OF POTASH.

Six samples were examined as follows:

9716. Stock of Brainard Nursery & Seed Co., Thompsonville. It contained 51.30 per cent. potash.

10638. Stock of E. E. Burwell, New Haven. It contained 50.92 per cent. potash.

9698. Stock of Geo. E. Butler, Meriden. It contained 53.84 per cent. potash.

10581. Stock of M. Keeney, Somersville. It contained 53.40 per cent. potash.

11014. Stock of E. J. Leonard, Wallingford. It contained 48.08 per cent. potash.

10848. Stock of John Wm. Norton, Madison. It contained 62.76 per cent. potash.

SULPHATE OF POTASH.

10580. Stock of M. Keeney, Somersville. It contained 47.76 per cent. potash. Sold for \$225.00 per ton. **Cost of potash 23.6 cents per pound.**

KAINIT.

10663. Sent by B. W. Ellis, County Agent, Putnam. It contained 15.50 per cent. potash.

The above samples, with exception of **10580**, represent small lots, in farmers' hands, probably not offered for sale.

COTTON HULL ASHES.

Five samples were analyzed as follows:

9756, 11364, 11365. Sold by Olds & Whipple, Hartford. Stock of J. B. Stewart, Windsor. Cost \$6.00 per unit of water-soluble potash, equivalent to 30 cents per pound for actual potash. The samples contained 25.74, 19.62 and 18.70 per cent. of potash respectively.

11295. Sold by Olds & Whipple, Hartford. Stock of E. P. Brewer, Silver Lane. Cost \$6.00 per unit of water-soluble potash, equivalent to 30 cents per pound for actual potash. It contained 24.66 per cent. of potash.

11448. Sold by Olds & Whipple, Hartford. Stock of John Wolf, Windsor. Cost \$6.50 per unit of water-soluble potash, equivalent to 33 cents per pound for actual potash. It contained 19.29 per cent. of potash.

The cost of water-soluble potash in this form has ranged from 30 to 33 cents per pound and even higher.

10660. Stated to be "feldspar potash," but not from any stock offered for sale. It contained 48.44 per cent. of water-soluble potash, chiefly in form of muriate.

11055. Alpha Potash—Lime Fertilizer. Made by the Alpha Portland Cement Co., Easton, Pa. Sampled and sent by the manufacturer. It contained 2.59 per cent. of water-soluble potash, 27.32 per cent. of lime and 1.01 per cent. of magnesia.

It is quoted by the manufacturer at \$12.00 per ton in bulk or \$15.00 in bags. At the latter price and making no allowance for lime, potash would cost **at the works** 28.9 cents per pound.

THE POTASH SITUATION.

Already truck crops in this country have undoubtedly suffered from lack of potash as respects their yield and shipping quality. No marked reduction of our staple crops, which have a longer growth period, or of fruit crops, has come to our notice.

That this lack of potash will continue in 1919 is beyond question.

Before the war the country imported about 230,000 tons of actual potash, more than 90 per cent. of which was used as a fertilizer. Our annual requirements for the immediate future are estimated at 250,000 tons.

In 1917 the total domestic production was estimated at 32,573 tons from the following sources:

From the brines of western "lakes".....	20,652 tons
kelp on the Pacific coast.....	3,572
molasses residues.....	2,846
the mineral alunite.....	2,402
all other sources.....	<u>3,101</u>
	32,573

The sources most promising for the future seem to be the brines and the dust from blast furnaces and cement kilns.

The data here given are taken from a publication of the U. S. Bureau of Mines, *The Potash Situation*, by A. W. Stockett.

In view of this critical situation, attention should be given to the careful conservation of the very considerable but neglected sources of home production. These have been discussed in Bulletin 198 of this Station, which is still available for distribution.

Some of the potash salts hitherto obtained from brines have contained considerable amounts of boric acid, and such salts have seriously damaged crops to which they were applied, as has been shown by Conner, of Purdue University, and others.

IV. RAW MATERIALS CHIEFLY VALUABLE FOR NITROGEN AND PHOSPHORIC ACID.

FISH MANURES.

Nine samples of fish manures have been examined. "Dry fish scrap" as put on the market before the war contained quite uniformly about 8.25 per cent. of nitrogen and 6.0 per cent. of phosphoric acid. The analyses here given show from 7.8 to 9.71 per cent. of nitrogen, while phosphoric acid ranges from 3.13 to 14.32 per cent. Obviously they are not wholly dried fish scrap, as the term was formerly used, and four of them are decidedly inferior to it in composition and value. These last may contain fish residues with or without some foreign material. Not more than three have a fairly consistent composition for dried fish scrap.

No. 11296, sent by Spencer Bros., Suffield, was damp and sticky, unfit mechanically to use in a drill. We understand that evaporated "soup" from the tankage manufacture is sometimes used in fertilizer mixtures and is apt to give this sticky consistence. For analyses see pages 134 and 135.

SLAUGHTER HOUSE TANKAGE.

Of the eight samples described in the table 10892 and 10889 have the composition of ground bone rather than of tankage. The same is true of 10601 although it was stated by the sender that it was sold for "blood tankage." 10891, sold by the Nitrate Agencies Co., failed to meet its guaranty in nitrogen and greatly overran that of phosphoric acid. It is probable that the stock which it represented was wrongly branded or mixed with other goods. For analyses see pages 134 and 135.

MIXED BONE AND TANKAGE.

11099. Lister's Celebrated Ground Bone and Tankage acidulated, made by Lister's Agricultural Chemical Works, Newark, N. J. From stock of H. J. Stanclift, New Hartford. Cost \$38.00 per ton.

Percentage composition

Nitrogen as nitrates.....	0.11
as ammonia.....	0.23
organic.....	2.77
total.....	3.11
Phosphoric acid—water-soluble.....	4.97
citrate-soluble.....	3.92
citrate-insoluble.....	3.34
total.....	12.23

ANALYSES OF

Station No.	Manufacturer.	Dealer or Purchaser.
	<i>Sampled by Station:</i>	
10895	Apothecaries Hall Co.....	W. J. Reeves, Windsorville.....
11102	Berkshire Fertilizer Co.....	Joseph Zawistovski, Hazardville.....
10964	A. L. Koster.....	Spencer Bros, Suffield.....
11090	Olds & Whipple.....	Factory.....
10752	Va.-Car. Chemical Co.....	S. J. Stevens, Glastonbury.....
	<i>Sampled by Purchaser:</i>	
11087	Standard Guano Co.....	Amer. Sumatra Co., Windsor Locks.
10687	A. L. Koster, Suffield.....	A. L. Koster, Suffield.....
11296	A. L. Koster, Suffield.....	Spencer Bros., Suffield.....
10913	.....	Orr Bros. Tobacco Co., Windsor....

* 0.25 per cent. nitrogen in nitrates.

GARBAGE TANKAGE.

10605 is tankage prepared from city garbage. Sent by the Bridgeport Hydraulic Co., Bridgeport. It contained 1.87 per cent. of nitrogen and 2.17 per cent. of phosphoric acid. 85 per cent. of the material was in particles coarser than 1-50 inch.

ANALYSES OF

Station No.	Manufacturer.	Dealer or Purchaser.
10892	Apothecaries Hall Co.....	Chas. Templeton, Waterbury.....
10889	Conn. Fat Rend. & Fert. Corp.....	Factory.....
11179	Unknown.....	Apothecaries Hall Co., Waterbury..
10618	N. Y. Dressed Meat Co.....	S. D. Woodruff & Sons, Orange....
10891	Nitrate Agencies Co.....	A. G. Ross, Bridgeport.....
10601	Quality Seed Store (dealer).....	Rowayton Green Houses, Rowayton
10602	Swift & Co.....	Rowayton Green Houses, Rowayton
10603	Godfrey Co-op. Fert. & Chem. Co.	Rowayton Green Houses, Rowayton

FISH MANURES.

As Ammonia.	Nitrogen.			Phosphoric Acid.			Total Phosphoric Acid.		Cost per ton.
	As Organic.	Total found.	Total guaranteed.	Water-soluble.	Citrate-soluble.	Citrate-insoluble.	Found.	Guaranteed.	
0.16	8.15	8.31	8.20	0.59	9.24	4.49	14.32	12.06	\$90.00
0.14	7.92	8.06	8.23	0.32	4.42	1.94	6.68	6.00	.....
0.46	8.71	9.42*	8.23	0.10	2.38	0.65	3.13	3.00	95.00
0.09	9.62	9.71	8.23	0.35	4.74	2.48	7.57	5.5	100.00
0.10	9.18	9.28	8.20	0.43	5.63	1.79	7.85	5.0	.....
.....	.....	7.82	8.22	.....	.....	.....	.....	.....	.....
0.37	8.94	9.31	8.22	0.18	2.51	0.83	3.52	3.0	.....
.....	.....	8.61	8.30	.....	.....	.....	2.75	.....	.....
0.06	7.88	7.94	....	0.38	4.43	0.31	5.12	....	82.00

BONE MANURES.

Twenty analyses of this material are tabulated on page 136. Only one fails to meet its guaranty, No. 11161, Armour's Bone Meal, which contains 0.32 per cent. less nitrogen than guaranteed.

Five samples have a composition like that of untreated raw bone meal. The others represent bone variously treated, with the re-

SLAUGHTER HOUSE TANKAGE.

As Ammonia.	Nitrogen.			Phosphoric Acid.			Mechanical Analysis.		Cost per ton.
	As Organic.	Total found.	Total guaranteed.	Found.	Guaranteed.	Finer than 1-50 inch.	Coarser than 1-50 inch.	.....
0.05	3.40	3.45	3.29	23.14	18.30	45.0	55.0	.....	\$50.00
0.06	3.08	3.14	3.29	23.44	20.00	58.0	42.0	.....	50.00
0.13	5.50	5.63	....	20.00	....	....	....	.....	.....
.....	.....	7.96	8.22	....	....	....	....	.....	.....
0.08	5.95	6.03	8.22	11.26	4.57	25.0	75.0	.....	80.00
0.14	1.95	2.09	....	18.59	....	60.0	40.0	.....	.....
0.34	6.16	6.50	....	9.10	....	46.0	54.0	.....	.....
0.16	4.50	4.66	....	7.54	....	44.0	56.0	.....	.....

ANALYSES OF

Station No.	Manufacturer and Brand.	Dealer or Purchaser.
	<i>Sampled by Station:</i>	
11149	Amer. Agr. Chem. Co., Fine Ground Bone	C. E. Slauson Co., Norwalk
11148	Apothecaries Hall Co., Bone Meal.....	Factory.....
11161	Armour Fertz. Works, Bone Meal.....	E. A. Buck & Co., Willimantic.....
11145	Berkshire Fertz. Co., Fine Ground Bone.	Wheeler & Co., Bridgeport.....
11146	Bowker Fertz. Co., Fresh Ground Bone.	Goodsell Bros., Bristol.....
11160	Coe-Mortimer Co., Fine Ground Bone..	O. C. Tuller, West Simsbury.....
11154	Essex Fertz. Co., Ground Bone.....	Manchester Plumbing Supply Co., Manchester.....
10715	L. T. Frisbie Co., Fine Bone Meal.....	Lightbourn & Pond Co., New Haven
11147	International Agr. Corp., Buffalo Bone Meal.....	Ansonia Flour & Grain Co., Ansonia
11157	Lister's Agr. Chem. Works, Lister's Bone Meal.....	S. J. Orr, West Suffield.....
11144	Lowell Fertz. Co., Lowell Ground Bone.	M. E. Cooke, Wallingford.....
11159	Nitrate Agencies Co., Ground Bone.....	J. A. Farrell, So. Norwalk.....
11156	Rogers & Hubbard Co., Hubbard's Strictly Pure Fine Bone.....	R. H. Hall Est., East Hampton.....
11155	Rogers & Hubbard Co., Pure Raw Knuckle Bone Flour.....	Cadwell & Jones, Hartford.....
11150	F. S. Royster Guano Co., Royster's Fine Ground Bone Meal.....	Silliman Hardware Co., New Canaan
11152	Sanderson Fertz. & Chem. Co., Fine Ground Bone.....	Factory.....
11153	M. L. Shoemaker & Co., Swift-Sure Bone Meal.....	Olds & Whipple, Hartford.....
11151	Van Iderstine Co., Van Iderstine Pure Ground Bone.....	J. B. McArdle, Greenwich.....
11158	Virginia-Carolina Chem. Co., Bone Meal	J. O. Fox & Co., Putnam.....
	<i>Sampled by Purchaser:</i>	
10682	L. T. Frisbie Co., Fine Bone Meal.....	A. E. Plant Sons' Co., Branford....

moval of a part of their nitrogen, excepting 11153, Shoemaker's Swift-Sure Bone Meal, which contains more nitrogen than any other.

Regarding Rogers & Hubbard Co.'s Strictly pure fine bone, the manufacturers state that, owing to the scarcity of raw bone, the brand had to be made of half raw and half steamed bone, but in 1919 the goods will have the same composition as formerly, made of raw bone and guaranteed to contain 3.82 per cent. of nitrogen and 24.70 of phosphoric acid.

BONE MANURES.

Nitrogen.		Phosphoric Acid.		Mechanical Analysis.		Cost per ton
Found.	Guaranteed.	Found.	Guaranteed.	Finer than 1-50 inch.	Coarser than 1-50 inch.	
2.64	2.47	28.91	22.88	63.0	37.0	\$60.00
2.79	2.47	25.71	22.00	39.0	61.0	44.00
2.15	2.47	28.84	22.00	48.0	52.0	58.00
3.16	2.47	21.16	20.00	40.0	60.0	45.00
2.74	2.47	24.20	22.88	44.0	56.0	49.00
2.75	2.47	25.13	22.88	43.0	57.0	44.00
2.83	2.46	25.59	22.00	54.0	46.0	52.00
3.16	2.46	26.92	22.00	46.0	54.0	48.00
2.92	2.50	23.62	22.00	47.0	53.0	50.00
3.26	2.47	24.79	23.00	53.0	47.0	45.00
3.26	2.05	26.33	26.00	49.0	51.0	48.00
2.59	2.46	24.18	22.88	53.0	47.0	.....
2.44	2.00	29.42	25.00	55.0	45.0	49.00
3.89	3.82	25.48	24.70	66.0	34.0	59.00
2.75	2.47	23.49	22.90	55.0	45.0	53.00
2.43	2.47	25.61	22.88	44.0	56.0	43.50
5.34	4.53	23.36	20.00	61.0	39.0	57.00
2.01	2.00	27.63	27.00	39.0	61.0	65.00
2.47	2.40	25.94	22.00	55.0	45.0	55.00
2.98	2.46	26.20	20.00	61.0	39.0	40.00

The average per cent. of nitrogen in all the samples is 2.93, of phosphoric acid 25.62, and the average price is \$50.76.

Allowing five or six cents per pound for phosphoric acid, the average cost of nitrogen has been between 34 and 44 cents per pound.

V. MIXED FERTILIZERS.

NITROGENOUS SUPERPHOSPHATES.

The following tables include analyses of 263 samples taken by the Station Agent and 4 taken by others. Of those sampled by the Station Agent 109 were guaranteed to contain potash.

REGARDING GUARANTIES.

Of the brands containing potash 29 failed in one or more respects to meet their guaranties. Of the 154 brands which did not contain potash, 34 failed to meet the guaranty either in nitrogen or in "available" phosphoric acid. Of all the nitrogenous superphosphates examined about 24 per cent. did not meet their guaranties in all particulars.

In most cases a deficiency in one ingredient was made up in money value by an overrun in the others.

In the following cases, however, this deficiency was not made good. Reckoning nitrogen and potash each at 30 cents per pound and "available" phosphoric acid at 6 cents, the deficiencies in money value of more than one dollar per ton were:

10734	Atlantic Packing Co.'s 4-8-2.....	\$2.75
10732	Bowker's Complete.....	4.66
11079	Chittenden's Complete Tobacco and Onion Grower.....	2.56
11124	" Conn. Tobacco Grower.....	2.50
10755	Mapes Potato Manure.....	1.04
10796	A. A. C. Co.'s Ammoniated Fertilizer AAAA.....	2.04
10963	Frisbie's Tobacco Special.....	2.08
10960	International Ag'l Corp'n's. Buffalo N. E. Special.....	1.86
11105	Lister's Ag'l. Chem. Works' Atlas Brand.....	1.24
10836	N. E. Fertilizer Co.'s Potato Fertilizer.....	1.80
11132	Royster Guano Co.'s Overland Top Dresser.....	6.45
10791	" " " Perfecto Tobacco Formula.....	1.38

REGARDING THE QUALITY OF PLANT FOOD IN NITROGENOUS SUPERPHOSPHATES.

The potash given in the analyses is all soluble in water and readily available to crops.

The same is true of the "soluble" phosphoric acid. The "citrate-soluble" phosphoric acid, which with the water-soluble is called "available" in trade usage, is doubtless more readily available to crops than the citrate-insoluble, but there are probably considerable differences in the agricultural value of citrate-soluble phosphoric acid coming from different sources or materials. The same is true

of insoluble phosphoric acid. Thus, the insoluble phosphoric acid of bone is more quickly available to crops than that of phosphate rock or apatite.

Considering phosphoric acid alone, it is safest to buy those mixed fertilizers in which the proportion of insoluble phosphoric acid is smallest.

Regarding the nitrogen in mixed fertilizers, the availability of the portion which is in the form of nitrate or ammonia is well understood.

The organic nitrogen of mixed fertilizers comes from a great number of materials differing widely in their availability. A method of measuring approximately their availability to crops by their solubility in chemical reagents, has been devised and its value has been checked by vegetation tests.

The method has been sufficiently discussed in previous reports. Only its application to the tabulated analyses need be noticed here.

The organic nitrogen is separated into the water-soluble and water-insoluble. The water-soluble may be considered available.

The water-insoluble nitrogen is tested for solubility in a definitely prepared potassium permanganate solution. If less than 50 per cent. is soluble by the alkaline treatment and less than 80 per cent. by the neutral treatment, the water-insoluble organic nitrogen is considered inferior in quality. In the following table are given those analyses in which the water-insoluble nitrogen was judged inferior by both of the methods and in which, deducting the insoluble, inactive nitrogen from the nitrogen found, that remaining did not meet the nitrogen guaranty.

ANALYSES REQUIRING SPECIAL NOTICE.

10732. Bowker's Complete. The manufacturer's chemist found 2.75 per cent. of potash, whereas our report shows 2.36 per cent.

11025. Apothecaries Hall Co.'s Victor Tobacco Special with Cotton Seed Meal Base. As this sample failed to meet the guaranty, a second sample, **11175**, was drawn at the manufacturer's request, which fully met the guaranty.

10775. Berkshire Fertilizer Co.'s Root Fertilizer. The manufacturer advises that the goods should show between 3 and 4 per cent. of water-soluble phosphoric acid, instead of only 1.12 as is reported in the table.

BRANDS IN WHICH INFERIOR FORMS OF NITROGEN ARE INDICATED.

Station No.	Brand.	Organic Nitrogen.					
		Total Water-soluble.	Acetate-insoluble.	Nitrate-insoluble.	Acetate-insoluble.	Nitrate-insoluble.	Acetate-insoluble.
11022	Apothecaries Hall Co.'s Victor Top Dresser.....	1.06	0.32	0.35	0.39	47.2	77.6
10774	Armour's 1-8-2.....	0.41	0.02	0.15	0.24	39.2	39.8
11021	" Wheat, Corn and Oat Special.....	0.76	0.22	0.26	0.28	47.6	74.8
10820	Bowker's Farm and Garden Phosphate.....	0.89	0.25	0.31	0.33	48.6	77.4
10799	Brown's Vegetable and Potato Grower.....	1.44	0.64	0.37	0.43	46.0	72.6
10739	E. F. Coe's New Englander Special.....	0.73	0.30	0.20	0.23	45.6	65.4
10884	" Ammoniated Dissolved Phosphate.....	1.06	0.44	0.29	0.33	46.4	77.8
10677	Frisbie's Connecticut Special.....	0.84	0.32	0.20	0.32	39.4	79.0
10970	Lowell Fertilizer Co.'s Bone Fertilizer.....	0.92	0.40	0.22	0.30	43.0	59.0
10755	Mapes' Potato Manure.....	0.81	0.14	0.26	0.41	38.2	74.8
10825	New England Fertilizer Co.'s Corn and Grain Fertilizer.....	0.83	0.29	0.23	0.31	43.4	76.4
10769	" " Superphosphate.....	1.04	0.40	0.30	0.34	47.0	62.2
10761	Olds & Whipple's Potato and All Crop Fertilizer.....	0.87	0.17	0.25	0.45	36.4	68.0
10981	Parmenter & Pusey's Plymouth Rock Brand.....	1.24	0.47	0.36	0.41	47.2	76.2
10980	" Star Brand Superphosphate.....	1.07	0.42	0.29	0.36	44.4	69.0
10762	Roxster Guano Co.'s Corn and Oats Fertilizer.....	0.86	0.37	0.19	0.30	39.6	62.2
10993	" " Drednought Fertilizer.....	0.75	0.28	0.20	0.27	42.2	56.8
11109	C. M. Shay's Shay's Formula.....	2.31	0.90	0.66	0.75	47.0	77.6

Percent.
soluble by Neur-

tral Method.

Percent.
soluble by Neur-

tral Method.

Percent.
soluble by Neur-

tral Method.

10876, International Agricultural Corporation's Buffalo Tobacco Grower contained less nitrogen and phosphoric acid than was guaranteed. Another sample was drawn at the manufacturer's request, **11133**, which met the guaranty.

10819, Royster Guano Co.'s Overland Top Dresser showed a considerable deficiency of nitrogen but nearly double the amount of phosphoric acid which was guaranteed. A second sample, **11132**, drawn from another lot at the manufacturer's request, contained less nitrogen than the former and less than half as much phosphoric acid. It is doubtful if either sample represents the average composition of this brand.

10791, Royster Guano Co.'s Perfecto Tobacco Manure, contained 0.3 per cent. less nitrogen than was guaranteed. A second sample, **11123**, drawn at the manufacturer's request from another lot, fully met the guaranty.

REGARDING THE PRICES OF MIXED FERTILIZERS.

The prices given in the table are those named by the dealer as cash retail ton prices.

The price of a given brand will be regulated, not only by its cost to the retailer, but also by his expenses for freight, storage and other overhead charges and by his margin of profit. This however does not, we believe, vitiate a comparison of average cost to the farmer for the purpose of this discussion.

There are a considerable number of brands which have the same guarantees and a like composition. Thus, we have 22 brands in each of which 3.29 per cent. of nitrogen and 10 per cent. of "available" phosphoric acid are guaranteed. There are 9 brands in which the same amount of nitrogen, a little less phosphoric acid, and 1 per cent. of potash are guaranteed.

The analyses of each of these different groups have been averaged with the prices, rejecting those in which the prices were very far from the average. As is justified by the figures previously given in this report, the phosphoric acid has been given a value of 8 cents and potash of 30 cents per pound, and with this allowance the cost of the nitrogen in the different groups has been calculated. The following table gives the results:

COST OF NITROGEN IN NITROGENOUS SUPERPHOSPHATES.

No. of Brands.	Per cent. of Nitrogen Guaranty.	Nitrogen.	Average percentage found of "Available" Phosphoric Acid.	Potash.	Nitrogen costs cents per pound.	Average cost per ton.
<i>Superphosphates without potash.</i>						
7	0.82	1.00	10.11	....	96.0	\$35.37
18	1.65	1.82	10.48	....	60.9	38.86
15	2.47	2.54	10.00	....	56.8	44.86
22	3.29	3.39	10.49	....	50.3	50.85
15	4.11	4.13	8.62	....	51.9	56.23
11	4.11	4.19	4.50	....	64.0	60.83
<i>Superphosphates with 1 per cent. potash.</i>						
10	1.65	1.77	9.51	1.12	71.0	47.06
10	2.06	2.26	9.11	1.01	64.2	49.65
13	2.47	2.55	9.15	1.06	54.3	48.70
9	3.29	3.36	9.45	1.15	52.0	56.94
8	4.11	4.36	7.02	1.17	52.5	64.03

The table is worth careful study by prospective purchasers. It shows quite conclusively that the buyer of brands with only 0.82 per cent. of nitrogen in them has paid not quite double as much for nitrogen as he would pay if he had bought goods with a higher guaranty of nitrogen and at a higher price. He would get his nitrogen cheapest if he bought with a guaranty of at least 2.47 per cent. nitrogen.

The buyer would save money by paying \$50.85 for a 3.29 nitrogen brand, instead of paying \$15.00 a ton less for 0.82 per cent. nitrogen goods. It was better buying to pay \$64 for a 5-7-1 formula than to pay \$47 for a 2.5-10-1 formula.

The reason is quite simple. It costs as much labor and material to mix, bag, ship and sell a low-grade fertilizer as it does to prepare high-grade goods, and they are practically alike on every ton, whether of high or low grade; therefore, they make the cost of plant food higher in those goods in which the amount of plant food is relatively small.

For example, suppose a ton of fertilizer (A) contains 40 pounds (2 per cent.) of nitrogen, and another (B) contains 80 pounds (4 per cent.) of nitrogen, and both contain equal amounts of phosphoric acid and potash. The nitrogen in each costs the manufacturer 30 cents per pound, and let us assume that the other plant food cost \$12. The "overhead charges" for costs and profits of manufacturer and sale will be alike in each case, which we will assume to be \$12 also.

	A	B
Cost of nitrogen.....	\$12.00	\$24.00
Cost of phosphoric acid and potash.....	12.00	12.00
Overhead charges.....	12.00	12.00
	<hr/>	<hr/>
Cost to farmer.....	\$36.00	\$48.00

In A, \$24 worth of plant food costs \$36. In B, \$36 worth costs \$48. Hence in A, \$1 worth of plant food costs $\frac{3}{4}$, or \$1.50, and in B $\frac{4}{3}$, or \$1.33.

These "overhead charges" have never been so great as now. The Station has always advised the buying of high-grade goods, but at present it is imperative.

There is nothing in the argument that if one wants to use only a small amount of nitrogen (perhaps on oats, for example) he should buy a formula containing a small amount of nitrogen. Many farmers need to get away from the idea of putting on so many pounds (or bags!) of fertilizer to the acre, and to figure only on the number of pounds of fertilizer ingredients which their land or crops need.

TABLE I—NITROGENOUS SUPERPHOSPHATES

Station No.	Manufacturer and Brand.	Place of Sampling.	Dealer's cash price per ton.
<i>Sampled by Station:</i>			
American Agricultural Chemical Co., New York City.			
10801	Complete Manure for Top Dressing 1916.	Thompsonville	\$64.00
10898	Lion Brand Potato Manure	Waterbury	75.00
11164	Potomac Complete Potato Manure 1916.	Orange	
10869	Sure Growth Phosphate 1916	Guilford	49.00
10902	Bradley's Complete Manure for Potatoes and Vegetables 1916	Bristol	59.00
11029	Bradley's Corn Phosphate 1916	Willimantic	47.00
11065	Bradley's Half Century Fertilizer 1916	Canaan	53.00
10900	Bradley's New Method Fertilizer 1916	Middletown	45.00
11030	Bradley's Potato Fertilizer 1916	Willimantic	47.00
10821	Bradley's Patent Superphosphate 1916	Bristol	49.00
10754	Bradley's Potato Manure 1916	Norwalk	55.00
10901	Bradley's Sea Fowl Guano 1916	Middletown	48.00
11103	Bradley's Tobacco Manure	East Hartford	75.00
10800	Bradley's Unicorn 1916	Glastonbury	
10803	East India Corn King 1916	Burnside	46.50
10804	East India Potato and Garden Manure	Burnside	55.00
10904	Great Eastern General 1916	New Canaan	
10809	Great Eastern Northern Corn Special 1916	East Hampton	46.00
10903	Great Eastern Potato Manure 1916	East Hampton	48.00
10810	Packers Union Gardeners' Complete Manure 1916	East Hampton	50.00
10867	Quinnipiac Ammoniated Dissolved Bone 1916	Branford	43.00
11122	Quinnipiac B. Fertilizer	Shelton	46.00
10740	Quinnipiac Climax Phosphate 1916	Milford	39.50
10906	Quinnipiac Fish and Potash Mixture 1916	Branford	50.00
10907	Quinnipiac Market Garden Manure 1916	Milford	59.50
10905	Quinnipiac Potato Phosphate 1916	South Norwalk	53.00
11163	Wheeler's Corn Fertilizer 1916	Riverton	44.00
11064	Wheeler's Cuban Tobacco Grower 1916	New Milford	65.00
10909	Williams and Clark's Americus Corn Phosphate 1916	South Manchester	44.00
10822	Williams and Clark's Americus H. G. Special for Potatoes and Root Crops 1916	Waterbury	65.00
10773	Williams and Clark's Americus Potato Manure 1916	Waterbury	55.00
10908	Williams and Clark's Special Prolific Crop Producer	Waterbury	50.00
Armour Fertilizer Works, Chrome, N. J.			
†10774	Armour's 1-8-2	Norwalk	53.00
10742	Armour's 2-8-3	New Haven	60.00
11101	Armour's Special Tobacco Grower No. 1	Hazardville	70.00
†11021	Armour's Wheat, Corn and Oats Special	New Haven	40.00
10738	Bidwell's 3-8-1	Windsor Locks	49.00
Atlantic Packing Co., New Haven.			
*10734	Atlantic 4-8-2	New Haven	62.7

* See note on page 138.

† See table on page 140.

WITH POTASH.

In Nitrates.	Nitrogen.				Phosphoric Acid.								Potash.			Station No.
	In Ammonia.	Organic, water-soluble.	Organic, water-insoluble.	Total.	Watersoluble.	Citrate-soluble.	Citrate-insoluble.	Total.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	As Muriate	Total.	Guaranteed.
	Found.			Guaranteed.	Found.		Found.	Guaranteed.	Found.		Found.		As Muriate	Total.	Guaranteed.	
64	1.38	0.40	0.98	4.40	4.11	6.43	2.22	1.11	9.76	9.00	8.65	8.00	0.32	1.11	1.00	10801
78	1.02	0.97	0.51	3.28	3.29	7.09	3.16	1.37	11.62	11.00	10.25	10.00	2.75	2.90	3.00	10898
75	0.05	0.21	0.74	1.75	1.65	6.76	2.72	2.01	11.49	10.00	9.48	9.00	0.44	1.10	1.00	11164
22	0.42	0.26	0.63	2.53	2.47	7.23	2.77	2.05	12.05	10.00	10.00	9.00	0.43	1.02	1.00	10869
53	0.54	0.44	0.81	3.32	3.29	6.95	2.58	1.50	11.03	10.00	9.53	9.00	0.35	1.07	1.00	10902
11	0.57	0.21	0.45	2.34	1.65	5.56	3.42	0.79	9.77	11.00	8.98	10.00	0.66	1.06	1.00	11029
77	0.14	0.45	0.74	2.10	2.06	7.23	2.84	1.61	11.68	11.00	10.07	10.00	0.45	1.03	1.00	11065
53	0.24	0.28	0.83	1.88	0.82	4.58	4.06	1.13	9.77	9.00	8.64	8.00	0.35	0.86	1.00	10900
10	0.58	0.24	0.42	2.34	2.06	5.34	3.34	0.79	9.47	9.00	8.68	8.00	0.62	1.07	1.00	11030
79	0.58	0.12	0.74	2.23	2.06	5.88	2.65	1.30	9.83	9.00	8.53	8.00	0.35	0.99	1.00	10821
150	0.64	0.19	0.56	2.54	2.47	7.80	1.97	2.01	11.78	10.00	9.77	9.00	0.45	1.06	1.00	10754
120	0.15	0.31	0.46	1.04	0.82	7.10	3.49	1.83	12.42	11.00	10.59	10.00	0.56	1.06	1.00	10901
98	0.07	1.25	2.16	4.46	4.53	0.20	3.91	0.09	4.20	4.00	4.11	3.00	0.76	3.89	3.00	11103
70	0.24	0.31	0.78	2.03	1.65	5.45	4.27	1.54	11.26	10.00	9.72	9.00	0.39	1.16	1.00	10800
68	0.16	0.58	1.13	2.47	2.45	5.14	0.01	2.17	11.69	10.00	9.52	9.00	0.56	0.89	1.00	10803
120	0.77	0.23	1.39	3.51	3.29	6.76	2.63	1.48	10.87	11.00	9.39	9.00	0.40	1.09	1.00	10804
07	0.06	0.53	0.46	1.12	0.82	6.06	3.06	1.38	10.50	9.00	9.12	8.00	0.35	0.99	1.00	10904
33	0.45	0.42	0.52	2.22	2.06	2.46	5.21	2.53	10.20	9.00	7.67	8.00	0.35	0.92	1.00	10809
76	0.51	0.18	0.67	2.12	2.06	7.91	2.09	1.85	11.85	11.00	10.00	10.00	0.23	1.02	1.00	10903
20	0.68	0.17	0.65	2.70	2.47	7.49	1.86	1.42	10.77	10.00	9.35	9.00	0.40	1.06	1.00	10810
45	0.44	0.31	0.67	1.87	1.65	7.58	2.88	0.91	11.37	10.00	10.46	9.00	0.76	1.37	1.00	10867
190	0.21	0.28	0.59	1.27	1.23	6.94	3.18	1.47	11.59	11.00	10.12	10.00	0.45	1.02	1.00	11122
..	0.13	0.55	0.27	0.95	0.82	4.83	3.68	1.06	9.57	9.00	8.51	8.00	0.26	0.88	1.00	10740
13	0.26	0.51	1.21	2.41	2.47	4.89	4.17	1.62	10.68	10.00	9.06	9.00	0.62	1.25	1.00	10906
33	0.72	0.15	0.75	3.55	3.29	7.24	2.28	1.29	10.81	10.00	9.52	9.00	0.35	1.22	1.00	10907
34	0.31	0.55	0.46	2.16	2.06	3.13	4.66	2.24	10.03	9.00	7.79	8.00	0.33	0.90	1.00	10905
55	0.36	0.21	0.58	1.70	1.65	7.74	2.29	1.82	11.85	11.00	10.03	10.00	0.23	1.00	1.00	11163
33	0.03	0.19	3.38	4.63	4.53	0.83	2.59	0.70	4.12	4.00	3.42	3.00	0.33	1.31	1.00	11064
32	0.36	0.32	0.64	1.94	1.65	7.55	2.87	0.72	11.14	11.00	10.42	10.00	0.64	1.37	1.00	10909
30	0.75	0.03	0.90	3.48	3.29	7.33	1.81	0.90	10.04	10.00	9.14	9.00	0.43	1.13	1.00	10822
33	0.27	0.58	0.55	2.23	2.06	3.71	4.12	2.33	10.16	9.00	7.83	8.00	0.31	0.95	1.00	10773
..	0.12	0.61	0.22	0.95	0.82	4.41	4.10	1.20	9.71	9.00	8.51	8.00	0.21	0.90	1.00	10908
30	0.29	0.02	0.39	0.83	0.82	3.34	4.55	1.30	9.19	8.50	7.89	8.00	0.74	2.66	2.00	10774
18	0.06	0.09	1.41	1.64	1.65	4.64	3.30	0.91	8.85	8.50	7.94	8.00	1.78	2.88	3.00	10742
12	0.09	0.10	3.29	4.50	4.11	3.31	1.73	1.15	6.19	4.50	5.04	4.00	0.09	1.18	1.00	11101
20	0.09	0.22	0.54	0.97	0.82	4.05	2.93	0.68	7.66	7.50	6.98	7.00	0.70	1.09	1.00	11021
0	0.38	0.34	1.23	2.35	2.47	5.50	3.63	0.93	0.06	8.50	9.13	8.00	0.69	1.00	1.00	10738
1	0.88	0.70	0.74	3.23	3.29	4.26	4.15	1.82	10.23	9.00	8.41	8.00	1.12	1.52	2.00	10734

TABLE I—NITROGENOUS SUPERPHOSPHATES.

Station No.	Manufacturer and Brand.	Place of Sampling.	Dealer's cash price per ton.
	<i>Sampled by Station:</i>		
11057	Bowker Fertilizer Co., New York City. Bowker's All Round Fertilizer 1916.....	Buckland.....	.....
11070	Bowker's Ammoniated Food for Flowers.....	Waterbury.....	.....
*10732	†Bowker's Complete.....	Milldale.....	\$72.00
11062	Bowker's Complete Alkaline Tobacco Grower 1916.....	West Suffield.....	67.00
†10820	Bowker's Farm & Garden Phosphate 1916.....	Plainville.....	59.00
11061	Bowker's Hill & Drill Phosphate 1916.....	Manchester.....	47.00
11069	Bowker's Lawn and Garden Dressing 1918.....	New Haven.....	50.00
11037	Bowker's Potato Phosphate 1916.....	Rockville.....	47.00
11060	Bowker's Sure Crop Phosphate 1916.....	Manchester.....	41.00
11068	Stockbridge Early Crop Manure 1916.....	Milldale.....	64.00
11067	Stockbridge General Crop Manure 1916.....	Willimantic.....	55.00
	<i>E. D. Chittenden Co., Bridgeport, Conn.</i>		
11135	Complete Tobacco and Onion Grower, 1% Potash.....	Rockville.....	.....
*11079	Complete Tobacco and Onion Grower, 2% Potash.....	Enfield.....	51.00
*11124	Connecticut Tobacco Grower, 2% Potash.....	Suffield.....	80.00
11134	Tobacco Special 2% Potash.....	Suffield.....	75.00
	<i>Coe-Mortimer Co., New York City.</i>		
11072	H. G. Potato Fertilizer Revised.....	Greenwich.....	64.37
†10739	New Englander Special 1916.....	Milford.....	60.25
11078	Red Brand Excelsior Guano 1916.....	Glastonbury.....	.....
	<i>L. T. Frisbie Co., New Haven, Conn.</i>		
10959	Frisbie's 4-8-4.....	Guilford.....	70.00
	<i>International Agricultural Corporation, Buffalo, N. Y.</i>		
10770	Buffalo Economy.....	Ansonia.....	47.00
10962	Buffalo General Favorite.....	West Suffield.....	39.22
10771	Buffalo Tip Top.....	Ansonia.....	45.00
11075	Buffalo Triumph.....	Litchfield.....	55.00
	<i>Lister's Agricultural Chemical Works, Newark, N. J.</i>		
10966	Corn and Potato Fertilizer 1916.....	West Suffield.....	.....
11098	Potato and Corn No. 2 Fertilizer 1916.....	New Hartford.....	48.00
11088	Perfect Potato Manure 1916.....	Burnside.....	56.00
11076	Potato Manure 1916.....	Rockville.....	41.00
11131	Special Crop Producer 1916.....	Mt. Carmel.....	.....
11097	Special Tobacco Fertilizer 1916.....	Brookfield.....	.....
10965	Standard Pure Superphosphate of Lime 1916.....	West Suffield.....	.....
	<i>Lowell Fertilizer Co., Boston, Mass.</i>		
11130	Lowell 2-8-4.....	Enfield.....	60.00

* See note on page 138.

† See note on page 139.

‡ See table on page 140.

WITH POTASH—(Continued).

Nitrogen.				Phosphoric Acid.								Potash.			Station No.	
In Nitrates.	In Ammonia.	Organic, water-soluble.	Organic, water-insoluble.	Total.		Water-soluble.	Citrate-soluble.	Citrate-insoluble.	Total.		So-called "Available."		As Muriate.	Total.	Guaranteed.	
				Found.	Guaranteed.				Found.	Guaranteed.	Found.	Guaranteed.				
.79	0.14	0.45	0.76	2.14	2.06	7.19	3.50	1.30	11.99	11.00	10.69	10.00	0.39	1.13	1.00	11057
.65	0.06	0.21		2.92	2.47	0.15	6.06	1.66	7.87	7.00	6.21	6.00	2.38	2.82	2.00	11070
.25	0.64	0.51	0.66	3.06	3.29	7.59	2.88	1.07	11.54	11.00	10.47	10.00	0.68	2.36	3.00	10732
.06	0.04	0.22	0.99	4.31	4.11	0.87	3.71	0.45	5.03	5.00	4.58	4.00	0.32	1.28	1.00	11062
.34	0.14	0.25	0.64	1.37	1.65	7.11	2.61	1.37	11.09	11.00	9.72	10.00	0.64	1.31	1.00	10820
.07	0.58	0.34	0.66	2.65	2.47	6.74	2.63	1.13	10.50	10.00	9.37	9.00	0.35	1.11	1.00	11061
.84	0.67	0.44	0.61	2.56	2.47	3.53	4.33	2.09	9.95	9.00	7.86	8.00	0.28	0.88	1.00	11069
.62	0.36	0.27	0.54	1.79	1.65	7.40	2.47	1.57	11.44	11.00	9.87	10.00	0.29	1.03	1.00	11037
.17	0.19	0.22	0.48	1.06	0.82	7.46	3.04	1.83	12.33	11.00	10.50	10.00	0.51	1.08	1.00	11060
46	1.47	0.39	0.92	4.24	4.11	6.62	2.03	0.97	9.62	9.00	8.65	8.00	0.31	1.31	1.00	11068
58	1.11	0.22	0.61	3.52	3.29	5.54	3.90	1.02	10.46	10.00	9.44	9.00	0.47	1.01	1.00	11067
02	1.28	....	0.46	3.76	3.29	4.55	3.43	1.50	9.48	9.00	7.98	8.00	0.25	1.02	1.00	11135
98	0.75	0.08	0.28	3.09	3.29	6.30	1.97	0.38	8.65	9.00	8.27	8.00	0.51	1.72	2.00	11079
16	2.71	0.19	1.63	4.69	4.94	2.38	2.22	1.14	5.74	5.00	4.60	4.00	0.36	1.73	2.00	11124
22	2.17	0.21	2.71	4.31	4.12	1.82	2.60	0.79	5.21	5.00	4.42	4.00	0.65	2.26	2.00	11134
59	0.82	0.49	0.76	3.66	3.29	6.29	3.94	1.02	11.25	11.00	10.23	10.00	1.14	2.93	3.00	11072
..	0.05	0.30	0.43	0.78	0.82	6.59	2.57	1.25	10.41	9.00	9.16	8.00	0.31	0.85	1.00	10739
50	1.43	0.42	0.83	4.18	4.11	6.63	1.92	1.02	9.57	9.00	8.55	8.00	0.24	1.16	1.00	11078
89	1.01	0.87	0.80	3.57	3.29	2.28	5.87	2.53	10.68	....	8.15	8.00	2.41	4.93	4.00	10959
98	0.03	0.11	0.57	1.69	1.60	7.09	3.61	1.30	12.00	11.00	10.70	10.00	0.86	0.86	1.00	10770
68	0.03	0.06	0.39	1.16	0.80	7.16	2.23	0.47	9.86	9.00	9.39	8.00	0.70	0.70	1.00	10962
63	0.03	0.08	0.35	1.09	0.80	5.72	2.99	0.99	9.70	9.00	8.71	8.00	2.21	2.21	2.00	10771
95	0.04	0.06	0.51	1.56	1.60	6.90	2.38	0.47	9.75	9.00	9.28	8.00	1.68	1.68	2.00	11075
81	0.20	0.27	0.84	2.12	2.06	6.31	2.41	1.22	9.94	9.00	8.72	8.00	0.73	0.96	1.00	10966
82	0.15	0.32	0.85	2.14	2.06	8.26	2.43	1.34	12.03	11.00	10.69	10.00	0.58	1.18	1.00	11098
20	0.50	0.43	1.32	3.45	3.29	6.57	2.97	1.47	11.01	10.00	9.54	9.00	0.58	0.85	1.00	11088
79	1.53	0.30	0.69	4.31	4.11	5.45	2.97	1.52	9.94	9.00	8.42	8.00	0.40	0.98	1.00	11076
10	0.10	0.14	0.51	0.85	0.82	5.73	2.85	1.09	9.67	9.00	8.58	8.00	0.64	1.06	1.00	11131
86	0.14	0.37	0.83	2.20	2.05	8.19	2.29	1.28	11.76	11.00	10.48	10.00	0.68	1.21	1.00	11097
25	0.48	0.29	0.64	2.66	2.47	8.28	1.75	0.81	10.84	10.00	10.03	9.00	0.74	1.15	1.00	10965
60	0.23	0.41	0.57	1.81	1.64	2.37	5.63	1.51	9.51	9.00	8.00	8.00	2.11	5.31	4.00	11130

TABLE I—NITROGENOUS SUPERPHOSPHATES.

Station No.	Manufacturer and Brand.	Place of Sampling.	Dealer's cash price per ton.
<i>Sampled by Station:</i>			
The Mapes Formula & Peruvian Guano Co., New York City.			
10767	Corn Manure 1916 Brand.....	Windsor Locks.....	\$50.00
10737	General Special 1916 Brand.....	Windsor Locks.....	73.00
*10755	† Potato Manure 1916 Brand.....	Windsor Locks.....	58.00
10973	Tobacco Manure 1916 Brand.....	Hartford.....	88.00
10756	Tobacco Starter Improved.....	Hartford.....	58.00
10972	Top Dresser Half Strength 1916 Brand.....	Southington.....	74.00
10736	Top Dresser Full Strength 1916 Brand.....	Suffield.....	105.00
National Fertilizer Co., New York City.			
10823	Complete Root and Grain Fertilizer 1916.....	Silver Lane.....	
11038	Eureka Potato Fertilizer 1916.....	South Manchester.....	52.75
11096	Extra High Grade Manure 1916.....	West Cheshire.....	61.00
10741	Potato Phosphate 1916.....	Wallingford.....	
11036	Tobacco Special 1916.....	Simsbury.....	60.00
10976	Universal Phosphate 1916.....	Simsbury.....	34.50
10977	XXX Fish and Potash 1916.....	South Manchester.....	50.50
Olds & Whipple, Hartford, Conn.			
10979	Complete Corn, Potato and Onion Fertilizer.....	Ellington.....	52.75
10978	Complete Tobacco Fertilizer.....	South Windsor.....	
11137	Complete Tobacco Fertilizer.....	Chicopee Falls, Mass.....	
11136	Complete Tobacco Fertilizer.....	Chicopee Falls, Mass.....	
Rogers & Hubbard Co., Portland, Conn.			
10720	Hubbard's Bone Base Soluble Potato Manure.....	Milford.....	60.00
10807	R and H. Tobacco Grower (Vegetable Formula).....	Windsor.....	
F. S. Royster Guano Co., Baltimore, Md.			
11129	Arrow Head Tobacco Fertilizer.....	Bloomfield.....	
†10993	Dreadnought Fertilizer.....	Watertown.....	50.25
11092	Drillwell Phosphate.....	Glastonbury.....	40.00
10733	Fish and Potash Mixture.....	Cheshire.....	39.75
10992	Logical Compound.....	Plainville.....	50.00
Sanderson Fertilizer & Chemical Co., New Haven, Conn.			
10829	Atlantic Coast Bone, Fish & Potash 1916.....	East Hampton.....	46.00
10830	Corn Superphosphate 1916.....	Derby.....	58.00
10994	Formula A 1916.....	Shelton.....	59.00
10995	Formula B 1916.....	Glastonbury.....	55.25
10731	Potato Manure 1916.....	Plainville.....	47.00
11128	Special Formula A.....	Niantic.....	72.00
11127	Kelsey's Bone, Fish and Potash 1916.....	Branford.....	48.00

* See note on page 138.

† See table on page 140.

WITH POTASH—(Continued).

In Nitrates.	Nitrogen.				Phosphoric Acid.								Potash.			Station No.	
	In Ammonia.	Organic, water-soluble.	Organic, water-insoluble.	Total.	Found.	Guaranteed.	Water-soluble.	Citrate-soluble.	Citrate-insoluble.	Total.	Found.	Guaranteed.	So-called Available."	Found.	Guaranteed.	As Muriate	Total.	Guaranteed.
2.04	0.03	0.11	0.52	2.67	2.47	3.32	5.00	2.67	10.99	10.00	8.32	8.00	0.23	0.57	1.00	10767	
4.93	0.03	0.18	1.14	6.28	5.76	1.74	4.97	2.17	8.88	8.00	6.71	6.00	0.37	1.09	1.00	10737	
2.83	0.05	0.14	0.67	3.69	3.71	2.58	6.05	2.14	10.77	8.00	8.63	8.00	0.21	0.72	1.00	10755	
5.66	0.07	0.19	2.79	8.71	8.23	0.04	5.74	2.46	8.24	8.00	5.78	5.00	0.65	1.71	1.00	10973	
3.04	0.04	0.14	1.17	4.39	4.12	1.00	5.29	3.34	9.63	8.00	6.29	6.00	0.25	0.85	1.00	10756	
5.38	0.02	0.29	5.69	4.94	0.55	2.11	1.34	4.00	4.00	2.66	2.50	0.47	0.78	0.50	10972		
0.04	....	0.21	10.25	9.88	0.63	5.56	1.46	7.65	8.00	6.19	5.00	0.96	2.54	1.00	10736		
1.73	0.61	0.36	0.79	3.49	3.29	6.98	2.07	1.38	10.43	10.00	9.05	9.00	0.47	1.26	1.00	10823	
1.25	0.77	0.26	0.55	2.83	2.47	6.86	2.28	1.07	10.21	10.00	9.14	9.00	0.39	1.09	1.00	11038	
1.96	0.16	0.57	1.73	4.42	4.11	3.59	4.86	1.16	9.61	9.00	8.45	8.00	0.52	0.97	1.00	11096	
0.82	0.36	0.51	0.48	2.17	2.06	2.98	4.49	2.32	9.79	9.00	7.47	8.00	0.31	0.86	1.00	10741	
1.44	0.05	0.36	3.40	5.25	4.53	1.32	2.48	0.52	4.32	4.00	3.80	3.00	0.20	1.40	1.00	11036	
0.14	0.21	0.07	0.45	0.87	0.82	7.34	2.68	1.80	11.82	11.00	10.02	10.00	0.48	1.07	1.00	10976	
0.58	0.80	0.25	1.12	2.75	2.06	5.99	4.36	1.23	11.58	11.00	10.35	10.00	0.29	0.90	1.00	10977	
1.38	0.12	0.40	1.75	3.65	3.30	2.69	4.68	0.79	8.16	6.00	7.37	6.00	0.58	2.33	1.00	10979	
0.87	0.06	0.47	3.10	4.50	4.11	0.57	3.75	0.17	4.49	3.00	4.32	3.00	0.67	4.27	4.00	10978	
0.93	0.07	0.47	3.20	4.61	4.11	.....	.....	.....	4.80	3.00	.....	.....	.....	4.20	3.00	11137	
2.66	0.13	0.78	1.06	4.63	4.25	2.34	7.13	3.83	13.30	13.00	9.47	10.00	0.26	1.29	1.00	10720	
1.55	0.19	0.39	3.17	5.30	5.00	0.10	4.40	2.29	6.79	5.00	4.50	4.00	0.27	0.98	0.50	10807	
0.13	0.90	0.55	2.28	3.86	4.11	2.22	2.08	0.50	4.80	4.50	4.30	4.00	0.33	2.22	2.00	11129	
0.06	0.84	0.28	0.47	1.65	1.65	4.35	3.80	0.92	9.07	8.50	8.15	8.00	0.64	2.04	2.00	10993	
0.11	1.22	0.24	0.82	2.39	2.47	4.79	3.82	1.16	9.77	8.50	8.61	8.00	0.47	1.37	1.00	11092	
0.10	0.87	0.23	0.47	1.67	1.65	5.49	2.28	0.67	8.44	8.50	7.77	8.00	0.51	1.02	1.00	10733	
0.13	0.79	0.25	0.48	1.65	1.65	5.31	2.68	0.75	8.74	8.50	7.99	8.00	0.54	0.96	1.00	10992	
0.46	0.09	0.38	0.86	1.79	1.65	4.85	4.43	2.02	11.30	10.00	9.28	9.00	0.94	1.23	1.00	10829	
0.49	0.41	0.11	0.74	1.75	1.65	7.62	2.85	1.06	11.53	11.00	10.47	10.00	0.66	1.24	1.00	10830	
1.33	0.13	0.60	1.16	3.22	3.29	5.28	4.64	1.41	11.33	10.00	9.92	9.00	0.89	0.89	1.00	10994	
1.19	0.98	0.11	1.09	3.37	3.29	7.01	4.08	1.93	13.02	10.00	11.09	8.00	0.27	0.94	1.00	10995	
0.62	0.10	0.53	1.01	2.26	2.06	5.05	4.48	1.87	11.40	9.00	9.53	8.00	0.25	1.21	1.00	10731	
1.18	0.83	....	1.12	3.13	3.29	5.45	3.19	0.88	9.52	9.00	8.64	8.00	2.38	4.56	4.00	11128	
0.85	0.96	0.03	0.75	2.59	2.47	5.96	3.66	0.56	10.18	10.00	9.62	9.00	0.40	1.12	1.00	11127	

TABLE I—NITROGENOUS SUPERPHOSPHATES.

Station No.	Manufacturer and Brand.	Place of Sampling.	Dealer's cash price per ton.
<i>Sampled by Station:</i>			
Virginia-Carolina Chemical Co., New York City.			
10998	Indian Brand for Tobacco No. 1.....	Simsbury.....	\$69.50
11108	Indian Brand for Tobacco No. 2.....	Simsbury.....	
10840	National Corn, Grain and Grass Top Dresser.....	Hartford.....	58.00
10753	Owl Brand Potato and Truck Fertilizer with 1% Potash.....	Glastonbury.....	40.00
10832	XXXX Fish and Potash Mixture.....	Glastonbury.....	.....
 Wilcox Fertilizer Co., Mystic, Conn.			
11006	Fish and Potash.....	Meriden.....	45.75
11001	Potato, Onion and Vegetable Phosphate.....	Ellington.....	57.00
10838	Tobacco Special.....	Ellington.....	68.00
 <i>Sampled by Purchaser:</i>			
10681	Frisbie's 4-8-2.....	Branford—The A. E. Plant Sons' Co.....	60.00

WITH POTASH—(Concluded).

In Nitrates.	Nitrogen.				Phosphoric Acid.								Potash.			Station No.			
	In Ammonia.	Organic, water-soluble.	Organic, water-insoluble.	Total.	Water-soluble.				Citrate-soluble.		Citrate-insoluble.		Total.	So-called "Available."		As Muriate.	Total.	Guaranteed.	
	Found.			Guaranteed.	Found.			Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.	As Muriate.	Total.	Guaranteed.	
... 2.20	0.20	1.72	4.12	4.12	1.71	2.12	0.79	4.62	5.00	3.83	4.00	0.43	2.04	2.00	10998				
... 2.22	2.01	0.03	1.79	4.05	4.12	1.54	2.26	1.45	5.25	5.00	3.80	4.00	0.21	1.24	1.00	11108			
... .51	0.08	0.21	0.57	3.37	....	6.52	1.74	0.86	9.12	9.00	8.26	8.00	0.37	1.30	1.00	10840			
... 0.96	0.21	0.48	1.65	1.65	5.19	3.27	1.62	10.08	9.00	8.46	8.00	0.32	0.98	1.00	10753				
... 1.67	0.15	0.38	2.20	1.65	5.17	2.78	1.32	9.27	9.00	7.95	8.00	0.37	1.24	1.00	10832				
... .28	0.03	0.08	0.99	2.38	2.46	7.80	1.38	0.67	9.85	9.00	9.18	8.00	1.32	1.32	1.00	11006			
... .23	0.01	0.21	1.00	3.45	3.30	8.04	2.64	3.10	13.78	11.00	10.68	10.00	1.12	1.12	1.00	11001			
... .22	0.03	0.09	3.18	4.52	4.12	1.65	2.90	4.02	8.57	6.00	4.55	4.00	1.06	1.69	1.00	10838			
... .97	0.74	0.90	0.75	3.36	3.28	3.53	4.87	2.03	10.43	9.00	8.40	8.00	1.66	2.46	2.00	10681			

TABLE II—NITROGENOUS SUPERPHOSPHATES.

Station No.	Manufacturer and Brand.	Place of Sampling.	Dealer's cash price per ton.
<i>Sampled by Station:</i>			
American Agricultural Chemical Co., New York City.			
10794	Ammoniated Fertilizer A.....	Plantsville.....	\$32.00
10772	Ammoniated Fertilizer AA.....	Waterbury.....	50.00
10868	Ammoniated Fertilizer AAA.....	Branford.....	44.00
*10796	Ammoniated Fertilizer AAAA.....	Branford.....	49.00
11059	Cereal and Root Fertilizer.....	Putnam.....	46.00
11005	Complete Manure without Potash.....	Ellington.....	.....
10862	Extra Quality Potato Manure.....	Ellington.....	39.00
11008	Odorless Grass and Lawn Top Dressing without Potash.....	Stafford Springs.....	63.00
11058	Special Vegetable Fertilizer.....	Putnam.....	54.00
11066	5-8 Fertilizer.....	Windsor Locks.....	.....
11009	Bradley's Grain Fertilizer.....	South Coventry.....	34.00
10899	Bradley's Root Crop Manure.....	Talcottville.....	42.00
11010	Bradley's Special Corn Phosphate without Potash.....	Willimantic.....	37.00
11011	Bradley's Special Potato Fertilizer without Potash.....	Willimantic.....	37.00
11026	Bradley's Special Potato Manure without Potash.....	Ellington.....	.....
10789	Bradley's Tobacco Manure without Potash.....	Suffield.....	63.00
10802	East India Tobacco Special without Potash.....	Burnside.....	59.00
11032	Quinnipiac Special Corn Manure without Potash.....	New London.....	42.00
11031	Quinnipiac Special Potato Phosphate without Potash.....	Stafford Springs.....	37.50
10790	Quinnipiac Wrapper Leaf Brand Tobacco Manure without Potash.....	Suffield.....	63.00
10805	Williams and Clark's Seed Leaf Tobacco Manure without Potash 1916.....	South Manchester.....	62.00
11028	Williams and Clark's Special Americus Corn Phosphate without Potash.....	Ellington.....	38.50
11027	Williams and Clark's Special Americus Potato Manure without Potash.....	Ellington.....	38.50
<i>Apothecaries Hall Co., Waterbury, Conn.</i>			
11023	Victor Corn, Fruit and All Crops.....	Factory.....	38.00
10759	Victor Market Gardeners' Special.....	Cheshire.....	52.00
10912	Victor Potato and Vegetable Special.....	Factory.....	43.70
†11025	Victor Tobacco Special (C. S. M. Base).....	Windsorville.....	.....
†11175	Victor Tobacco Special (C. S. M. Base).....	Burnside.....	60.00
†11022	Victor Top Dresser for Grass and Grain.....	Milldale.....	62.00
<i>Armour Fertilizer Works, Chrome, N. J.</i>			
11024	Special Tobacco Grower No. 2.....	Hazardville.....	62.00
10828	2-10.....	Manchester.....	40.00
10865	4-10.....	Hazardville.....	52.25
<i>Atlantic Packing Co., New Haven.</i>			
10873	Corn and Grain Fertilizer.....	New Haven.....	39.00
10872	Potato Phosphate.....	New Haven.....	45.50
10792	Special Vegetable.....	New Haven.....	52.75

* See note on page 138.

† See note on page 139.

‡ See table on page 140.

WITHOUT POTASH.

In Nitrates.	Nitrogen.					Phosphoric Acid.								Station No.		
	In Ammonia.	Organic, water-soluble.	Organic, water-insoluble.	Total.	Found.	Guaranteed.	Water-soluble.	Citrate-soluble.	Citrate-insoluble.	Total.	Found.	Guaranteed.	So-called "Available."	Found.	Guaranteed.	
....	0.09	0.44	0.36	0.89	0.82	5.78	4.53	1.20	11.51	11.00	10.31	10.00	10794			
0.46	0.22	0.66	0.52	1.86	1.65	6.14	4.33	2.17	12.64	11.00	10.47	10.00	10772			
0.85	0.58	0.28	0.70	2.41	2.47	8.12	2.94	0.84	11.90	11.00	11.06	10.00	10868			
1.36	0.62	0.21	0.68	2.87	3.29	7.30	3.10	1.09	11.49	11.00	10.40	10.00	10796			
1.10	0.64	0.15	0.66	2.55	2.47	5.57	4.38	1.41	11.36	11.00	9.95	10.00	11059			
1.02	0.05	0.13	3.34	4.54	4.53	1.04	3.63	0.24	4.91	4.00	4.67	3.00	11005			
1.90	1.42	0.21	0.68	4.21	4.11	6.74	3.48	1.43	11.65	11.00	10.22	10.00	10862			
1.96	1.30	0.26	0.70	4.22	4.10	6.59	3.35	1.32	11.26	11.00	9.94	10.00	11008			
1.52	0.79	0.19	0.87	3.37	3.29	6.05	3.92	1.54	11.51	11.00	9.97	10.00	11058			
1.45	1.12	0.49	1.24	4.30	4.11	5.93	2.32	1.24	9.49	9.00	8.25	8.00	11066			
0.42	0.10	0.08	0.22	0.82	0.82	5.18	4.89	0.88	10.95	11.00	10.07	10.00	11009			
1.64	0.88	0.21	0.59	3.32	3.29	6.69	3.34	1.00	11.03	11.00	10.03	10.00	10899			
0.68	0.52	0.05	0.54	1.79	1.65	6.33	4.88	1.20	12.41	11.00	11.21	10.00	11010			
0.73	0.44	0.03	0.57	1.77	1.65	5.35	5.10	1.32	11.77	11.00	10.45	10.00	11011			
1.20	0.43	0.19	0.61	2.43	2.47	5.53	4.51	1.54	11.58	11.00	10.04	10.00	11026			
1.13	0.02	0.17	3.26	4.58	4.53	0.63	3.67	0.64	4.94	4.00	4.30	3.00	10789			
1.04	0.08	0.23	3.26	4.61	4.53	0.85	3.25	0.42	4.52	4.00	4.10	3.00	10802			
0.67	0.47	0.40	0.53	2.07	1.65	4.43	5.51	1.66	11.60	11.00	9.94	10.00	11032			
0.83	0.23	0.40	0.44	1.90	1.65	5.54	4.89	1.16	11.59	11.00	10.43	10.00	11031			
1.15	0.03	0.10	3.40	4.68	4.53	0.72	3.44	0.68	4.84	4.00	4.36	3.00	10790			
0.98	0.10	0.69	3.06	4.83	4.53	0.57	3.21	0.45	4.23	4.00	3.78	3.00	10805			
0.68	0.47	0.23	0.49	1.87	1.65	5.18	4.83	1.18	11.19	11.00	10.01	10.00	11028			
0.74	0.40	0.23	0.48	1.85	1.65	5.28	4.72	1.22	11.22	11.00	10.00	10.00	11027			
1.29	0.31	0.11	0.42	2.13	1.65	7.66	3.05	0.68	11.39	11.00	10.71	10.00	11023			
2.00	0.52	0.15	0.73	3.40	3.29	8.57	2.06	0.49	11.12	11.00	10.63	10.00	10759			
....	2.15	0.19	0.66	3.00	2.47	7.21	3.29	1.06	11.56	11.00	10.50	10.00	10912			
0.22	1.85	0.23	1.65	3.95	4.12	3.14	1.48	0.41	5.03	5.00	4.62	4.00	11025			
0.14	1.79	0.11	2.25	4.29	4.12	2.02	2.02	1.41	5.45	5.00	4.04	4.00	11175			
3.57	0.40	0.32	0.74	5.03	4.94	6.61	1.65	0.36	8.62	9.00	8.26	8.00	11022			
0.79	0.06	0.15	3.10	4.10	4.11	3.77	1.32	1.43	6.52	4.50	5.09	4.00	11024			
....	0.39	0.20	1.11	1.70	1.65	7.96	2.73	1.25	11.94	10.50	10.69	10.00	10828			
1.89	0.16	0.65	1.06	3.76	3.29	8.36	2.77	1.41	12.54	10.50	11.13	10.00	10865			
0.96	0.03	0.29	0.58	1.86	1.64	6.77	3.64	0.73	11.14	11.00	10.41	10.00	10873			
0.48	0.59	0.60	0.71	2.38	2.46	6.36	4.24	1.02	11.62	11.00	10.60	10.00	10872			
1.19	0.27	1.02	1.05	3.53	3.29	6.35	4.63	2.61	13.59	11.00	10.98	10.00	10792			

TABLE II—NITROGENOUS SUPERPHOSPHATES.

Station No.	Manufacturer and Brand.	Place of Sampling.	Dealer's cash price per ton.
	<i>Sampled by Station:</i>		
	Atlantic Packing Co., New Haven. (Continued).		
10911	Tobacco Special.....	South Windsor.....	\$57.00
10910	Top Dresser for Grass and Market Garden.....	New Haven.....	56.75
	Berkshire Fertilizer Co., Bridgeport, Conn.		
11042	Ammoniated Bone Phosphate.....	Waterbury.....	40.00
11041	Grass Special.....	Jewett City.....	58.00
11043	Market Garden Fertilizer.....	Chester.....	52.00
11040	Potato and Vegetable Phosphate.....	Westport.....	45.00
*10775	Root Fertilizer.....	Wethersfield.....	45.00
10863	Tobacco Grower.....	Rockville.....	57.00
11063	Tobacco Starter.....	Suffield.....	68.00
	F. E. Boardman, Middletown, Conn.		
11056	Fertilizer for Tobacco and General Crops.....	Factory .....	.....
	Bowker Fertilizer Co., New York City.		
11044	Four Ten Hill and Drill.....	Norwich.....	53.00
10795	High Nitrogen Mixture without Potash.....	Bristol.....	84.00
11034	One Ten Sure Crop.....	Willimantic.....	32.00
10834	Stockbridge Five Eight General Crop.....	Rockville.....	58.00
10717	Superphosphate with Ammonia 2%.....	New Haven.....	42.00
10758	Superphosphate with Ammonia 3%.....	Westport.....	44.75
10793	Superphosphate with Ammonia 4%.....	Milldale.....	49.50
11104	Superphosphate with Ammonia 5%.....	Plainville.....	53.00
11035	Three Ten All Round.....	Willimantic.....	45.00
10882	Tobacco Grower 1916.....	Thompsonville.....	62.00
10879	Two Ten Farm and Garden.....	Rockville.....	41.00
	F. O. Brown, Leonards Bridge, Conn.		
†10799	Vegetable and Potato Grower.....	Guilford.....	48.00
	E. D. Chittenden Co., Bridgeport, Conn.		
11125	Grass and Grain without Potash.....	Suffield.....	46.50
10878	Potato Special without Potash.....	Broad Brook.....	54.00
11106	Tobacco Special without Potash.....	Ellington.....	66.75
10757	Vegetable and Onion Grower without Potash.....	Greens Farms.....	47.00
	E. B. Clark Seed Co., Milford, Conn.		
10653	General Use Phosphate.....	Factory	43.00
10652	High Grade Special Fertilizer.....	Factory	46.00
10658	High Grade Special Fertilizer.....	Orange.....	46.00
	The Coe-Mortimer Co., New York City.		
10958	Connecticut Wrapper Grower without Potash.....	Poquonock.....	64.00
10883	Excelsior Potato Fertilizer 1916.....	Greenwich.....	83.00

* See Note on page 139.

† See table on page 140.

WITHOUT POTASH—(Continued).

In Nitrates.	Nitrogen.					Phosphoric Acid.					Station No.		
	In Ammonia.	Organic, water-soluble.	Organic, water-insoluble.	Total.	Guaranteed.	Water-soluble.	Citrate-soluble.	Citrate-insoluble.	Total.	Guaranteed.			
				Found.					Found.				
1.95	0.03	0.86	1.32	4.16	4.10	2.77	4.27	1.02	8.06	7.00	7.04	6.00	10911
0.74	1.76	0.64	0.75	3.89	4.10	5.45	3.08	0.63	9.16	9.00	8.53	8.00	10910
0.48	.....	0.06	0.73	1.27	0.80	3.58	6.87	0.51	10.96	11.00	10.45	10.00	11042
3.50	.....	0.17	1.39	5.06	5.00	0.65	4.77	0.35	5.77	6.00	5.42	5.00	11041
1.45	0.01	0.10	2.14	3.70	3.30	1.64	5.82	0.75	8.21	9.00	7.46	8.00	11043
1.00	0.01	0.13	1.21	2.35	1.70	3.36	6.27	0.83	10.46	11.00	9.63	10.00	11040
1.17	0.06	0.03	1.50	2.76	2.50	1.12	6.46	1.46	9.04	9.00	7.58	8.00	10775
1.30	0.04	0.64	2.53	4.51	4.11	1.37	2.62	0.41	4.40	4.00	3.99	3.00	10863
2.75	0.02	0.30	2.23	5.30	5.00	1.46	2.02	1.73	5.21	5.00	3.48	4.00	11063
1.36	0.09	0.59	1.50	3.54	3.29	2.03	5.39	0.97	8.39	.....	7.42	7.00	11056
1.34	1.12	0.50	0.44	3.40	3.29	5.87	4.32	0.74	10.93	11.00	10.19	10.00	11044
3.82	3.13	0.30	1.04	8.29	8.23	4.61	1.07	0.72	6.40	6.00	5.68	5.00	10795
0.46	0.12	0.17	0.26	1.01	0.82	6.11	3.56	0.95	10.62	11.00	9.67	10.00	11034
1.60	1.28	0.35	0.83	4.06	4.11	6.92	1.91	1.97	10.80	9.00	8.83	8.00	10834
0.63	0.27	0.29	0.55	1.74	1.65	6.91	3.72	1.84	12.47	11.00	10.63	10.00	10717
1.14	0.39	0.38	0.57	2.48	2.47	6.90	2.98	2.47	12.35	11.00	9.88	10.00	10758
1.66	0.38	1.36	0.71	4.11	3.29	7.53	2.94	1.94	12.41	11.00	10.47	10.00	10793
1.59	1.15	0.46	1.14	4.34	4.11	5.81	2.48	1.28	9.57	9.00	8.29	8.00	11104
1.18	0.76	0.24	0.35	2.53	2.47	6.91	3.11	1.11	11.13	11.00	10.02	10.00	11035
0.97	0.07	0.40	2.88	4.32	4.11	0.94	3.58	0.61	5.13	5.00	4.52	4.00	10882
0.65	0.23	0.32	0.58	1.78	1.65	7.65	3.28	1.57	12.50	11.00	10.93	10.00	10879
1.22	0.42	0.64	0.82	3.08	2.87	8.30	2.60	0.63	11.53	11.00	10.90	10.00	10799
0.14	3.73	0.03	0.59	4.49	4.12	7.97	1.62	0.36	9.95	11.00	9.59	10.00	11125
2.33	0.63	0.14	0.21	3.31	3.29	5.95	5.06	0.96	11.97	11.00	11.01	10.00	10878
0.20	2.62	0.02	1.71	4.55	4.52	0.99	2.07	0.78	3.84	4.00	3.06	3.00	11106
....	1.63	0.23	0.41	2.27	2.47	8.77	2.29	0.27	11.33	11.00	11.06	10.00	10757
1.52	0.65	~0.46	2.63	2.47	5.46	4.73	1.18	11.37	11.00	10.19	10.00	10653	
1.61	.....	0.34	1.35	3.30	3.29	9.68	1.33	0.24	11.25	11.00	11.01	10.00	10652
.....	.....	.....	.....	3.21	3.29	.....	.....	.....	11.69	11.00	.....	.....	10658
1.05	0.05	0.19	3.26	4.55	4.53	0.78	2.95	0.40	4.13	4.00	3.73	3.00	10958
1.98	1.34	0.09	1.11	4.52	4.11	8.71	1.77	0.96	11.44	11.00	10.48	10.00	10883

TABLE II—NITROGENOUS SUPERPHOSPHATES.

Station No.	Manufacturer and Brand.	Place of Sampling.	Dealer's cash price per ton.
	<i>Sampled by Station:</i>		
	The Coe-Mortimer Co., New York City. (Con.)		
10797	H. G. Ammoniated Superphosphate 1916.....	Greenwich.....	\$64.00
*10884	Original Ammoniated Dissolved Phosphate 1916.....	Middletown.....	47.00
10788	Prolific Crop Producer 1916.....	Milford.....	
11077	Tobacco Special.....	Simsbury.....	59.75
10787	Top Dressing Manure 1916.....	Milford.....	72.00
	Essex Fertilizer Co., Boston, Mass.		
10768	Fish Fertilizer.....	South Manchester.....	52.00
10881	Grain, Grass and Potato Fertilizer.....	South Manchester.....	42.00
10880	Market Garden and Potato Manure.....	North Haven.....	48.00
10835	Potato Phosphate.....	Ellington.....	55.00
11071	Tobacco 5-4.....	Rockville.....	65.00
	The L. T. Frisbie Co., New Haven, Conn.		
*10877	Connecticut Special.....	Meriden.....	58.00
10711	Corn and Grain Fertilizer.....	Meriden.....	41.50
10716	Market Garden and Top Dressing.....	New Haven.....	60.00
10885	Potato and Vegetable Grower.....	Cheshire.....	49.00
†10963	Tobacco Special.....	Hartford.....	61.75
	International Agricultural Corporation, Buffalo, N. Y.		
10875	Buffalo Farmers' Choice.....	West Suffield.....	35.63
11074	Buffalo Garden Truck.....	New Milford.....	50.00
†10960	Buffalo New England Special.....	Ansonia.....	41.00
10961	Buffalo Onion, Vegetable and Potato.....	Granby.....	44.00
11133	Buffalo Tobacco Grower.....	Warehouse Point.....	62.50
‡10876	Buffalo Tobacco Grower.....	West Suffield.....	59.85
	Lister's Agricultural Chemical Works, Newark, N. J.		
†11105	Atlas Brand.....	Rockville.....	
10824	Celebrated Tobacco Fertilizer without Potash.....	Warehouse Point.....	63.00
10874	Complete Tobacco Fertilizer without Potash.....	Rockville.....	60.00
11073	Plant Food 1916.....	Danbury.....	46.00
11033	Superior Ammoniated Superphosphate 1916.....	Glastonbury.....	53.00
	Lowell Fertilizer Co., Boston, Mass.		
10714	Animal Brand.....	Wallingford.....	52.00
*10970	Bone Fertilizer.....	Rockville.....	44.00
10969	Empress Brand.....	Southington.....	38.00
10968	Potato Manure.....	Saybrook.....	49.00
10818	Potato Phosphate.....	Suffield.....	51.00
10967	Tobacco Grower.....	Rockville.....	66.00
	E. Manchester & Sons, Winsted, Conn.		
10971	Manchester's 1918 Formula.....	Ellington.....	43.00

* See table on page 140.

† See note on page 138.

‡ See note on page 141.

WITHOUT POTASH—(Continued).

In Nitrates.	Nitrogen.					Phosphoric Acid.								Station No.
	In Ammonia.	Organic, water-soluble.	Organic, water-insoluble.	Total.	Found.	Water-soluble.	Citrate-soluble.	Citrate-insoluble.	Total.	Guaranteed.	So-called "Available."	Found.	Guaranteed.	
1.13	0.20	0.75	0.44	2.52	2.47	6.51	3.86	1.74	12.11	11.00	10.37	10.00	10797	
0.58	0.08	0.44	0.67	1.72	1.65	6.31	3.75	2.02	12.08	11.00	10.06	10.00	10884	
1.83	0.48	0.43	0.67	3.41	3.29	7.25	2.85	1.18	11.28	11.00	10.10	10.00	10788	
1.20	0.06	0.11	3.17	4.54	4.11	3.26	1.58	0.42	5.26	5.00	4.84	4.00	11077	
3.50	2.27	0.34	0.80	6.91	6.58	6.86	1.24	0.77	8.87	9.00	8.10	8.00	10787	
1.26	0.03	0.45	0.61	2.35	2.46	6.96	3.02	0.68	10.66	11.00	9.98	10.00	10768	
0.08	0.06	0.47	0.45	1.06	0.82	8.58	3.39	1.69	13.66	13.00	11.97	12.00	10881	
1.31	0.37	0.53	0.83	3.04	2.87	7.90	2.61	0.61	11.12	11.00	10.51	10.00	10880	
1.27	0.21	0.87	0.94	3.29	3.28	5.82	4.81	2.29	12.92	11.00	10.63	10.00	10835	
1.77	0.15	0.95	1.50	4.37	4.10	0.92	4.93	1.25	7.10	5.00	5.85	4.00	11071	
1.02	0.75	0.32	0.52	2.61	2.46	7.47	2.40	0.15	10.02	11.00	9.87	10.00	10877	
0.93	0.28	0.08	0.51	1.80	1.64	6.50	3.46	0.58	10.54	11.00	9.96	10.00	10711	
0.87	1.80	0.61	0.69	3.97	4.10	5.88	3.25	0.70	9.83	9.00	9.13	8.00	10716	
1.27	0.30	1.05	0.99	3.61	3.28	5.68	4.60	2.58	12.86	11.00	10.28	10.00	10885	
1.54	0.05	0.66	1.39	3.64	4.10	2.82	3.75	0.65	7.22	7.00	6.57	6.00	10963	
0.38	0.23	....	0.37	0.98	0.80	6.61	3.92	1.05	11.58	11.00	10.53	10.00	10875
1.04	0.90	0.43	0.99	3.36	3.30	6.24	4.50	1.46	12.20	11.00	10.74	10.00	11074	
0.17	0.26	0.09	0.78	1.30	1.60	4.46	5.49	1.60	11.55	11.00	9.95	10.00	10960	
1.15	0.41	0.18	1.08	2.82	2.50	7.15	3.49	0.92	11.56	11.00	10.64	10.00	10961	
0.95	0.72	0.18	2.29	4.14	4.10	1.07	3.20	0.67	4.94	5.00	4.27	4.00	11133	
1.40	0.98	0.08	1.48	3.94	4.10	1.31	2.78	0.78	4.87	5.00	4.09	4.00	10876	
1.54	0.90	0.40	1.01	3.85	4.11	5.66	2.61	1.45	9.72	9.00	8.27	8.00	11105	
1.40	0.05	0.07	2.89	4.41	4.53	2.28	1.30	0.55	4.13	4.00	3.58	3.00	10824	
1.62	0.89	0.36	1.09	3.96	4.11	1.62	2.61	1.23	5.46	5.00	4.23	4.00	10874	
0.17	0.15	0.27	0.37	0.96	0.82	6.85	3.62	0.97	11.44	11.00	10.47	10.00	11073	
1.82	0.75	0.43	0.58	3.58	3.29	8.34	2.17	1.05	11.56	11.00	10.51	10.00	11033	
0.96	0.59	0.49	0.67	2.71	2.87	6.49	4.27	0.47	11.23	11.00	10.76	10.00	10714	
0.69	0.41	0.40	0.52	2.02	2.05	7.09	3.99	0.42	11.50	11.00	11.08	10.00	10970	
0.09	0.42	0.54	0.52	1.57	1.23	7.60	3.03	0.40	11.03	11.00	10.63	10.00	10969	
1.13	0.76	0.36	0.54	2.79	2.46	7.57	2.26	0.26	10.09	11.00	9.83	10.00	10968	
1.28	0.29	0.96	1.04	3.57	3.28	5.77	5.25	1.96	12.98	11.00	11.02	10.00	10818	
2.14	0.07	0.59	1.45	4.25	4.10	2.84	4.16	0.88	7.88	7.00	7.00	6.00	10967	
0.40	0.15	0.91	1.04	2.50	2.47	5.40	4.73	1.20	11.33	.....	10.13	10.00	10971

TABLE II—NITROGENOUS SUPERPHOSPHATES.

Station No.	Manufacturer and Brand.	Place of Sampling.	Dealer's cash price per ton.
<i>Sampled by Station:</i>			
The Mapes Formula & Peruvian Guano Co., New York City.			
10826	5% Ammonia Special.....	Hartford.....	\$53.00
National Fertilizer Co., New York City.			
10713	Nitrogen Phosphate Mixture No. 1.....	Wallingford.....	.....
10712	Nitrogen Phosphate Mixture No. 2.....	Wallingford.....	.....
10974	Nitrogen Phosphate Mixture No. 3.....	Suffield.....	45.00
10798	Nitrogen Phosphate Mixture No. 4.....	Guilford.....	.....
11100	Nitrogen Phosphate Mixture No. 5.....	Somersville.....	54.00
10975	Tobacco Special without Potash.....	Warehouse Point.....	60.00
New England Fertilizer Co., Boston, Mass.			
†10825	Corn and Grain Fertilizer.....	Madison.....	36.00
*10836	Potato Fertilizer.....	Rockville.....	47.00
11200	Special Tobacco Manure (5-4).....	Suffield.....	60.00
†10769	Superphosphate.....	Suffield.....	48.00
Olds & Whipple, Hartford, Conn.			
†10761	Potato and All Crop Fertilizer.....	New Britain.....	41.75
10764	Special Grass Fertilizer.....	Factory.....	.....
11039	Special H. G. Tobacco Starter.....	Factory.....	98.75
10763	Special Onion, Corn and Potato Fertilizer.....	Factory.....	.....
11174	Tobacco Special Fertilizer.....	East Hartford.....	.....
10808	Tobacco Special Fertilizer.....	Windsor.....	.....
Parmenter & Polsey Fertilizer Co., Boston, Mass.			
11111	Grain Grower.....	Bloomfield.....	.....
†10981	Plymouth Rock Brand.....	Highwood.....	46.00
†10980	Star Brand Superphosphate.....	Hartford.....	.....
The Rogers & Hubbard Co., Portland, Conn.			
10722	Hubbard's Bone Base Oats and Top Dressing.....	Milford.....	68.00
10721	Hubbard's Bone Base Soluble Corn and General Crops.....	Milford.....	50.00
10988	R. and H. All Round Phosphate.....	South Manchester.....	38.00
10989	R. and H. All Soils—All Crops Phosphate.....	Hamden.....	.....
11094	R. and H. Bone Base Soluble Tobacco Manure.....	Gildersleeve.....	70.00
10990	R. and H. Climax Tobacco Brand.....	Windsor.....	.....
10806	R. and H. Complete Phosphate.....	South Manchester.....	35.00
10827	R. and H. Potato Phosphate.....	South Manchester.....	48.00
F. S. Royster Guano Co., Baltimore, Md.			
11095	Abundant Ammoniated Superphosphate.....	Watertown.....	59.00
10991	C. B. Fish Mixture.....	Cheshire.....	33.75
†10762	Corn and Oats Fertilizer.....	New Canaan.....	32.00
11089	Innovation Ammoniated Superphosphate.....	New Canaan.....	45.00
11093	Landmark Ammoniated Superphosphate.....	Madison.....	53.00

* See note on page 138.

† See table on page 140.

WITHOUT POTASH—(Continued).

In Nitrates.	Nitrogen.					Phosphoric Acid.					Station No.		
	In Ammonia.	Organic, water-soluble.	Organic, water-insoluble.	Total.		Water-soluble.	Citrate-soluble.	Citrate-insoluble.	Total.				
				Found.	Guaranteed.				Found.	Guaranteed.			
3.10	0.03	0.03	1.09	4.25	4.12	3.23	5.40	2.83	11.46	10.00	8.63	8.00 10826	
.....	0.10	0.29	0.48	0.87	0.82	7.95	2.76	2.07	12.78	11.00	10.71	10.00 10713	
0.56	0.21	0.50	0.58	1.85	1.65	4.93	4.42	2.32	11.67	11.00	9.35	10.00 10712	
0.47	0.15	0.81	1.27	2.70	2.47	5.73	4.06	1.77	11.56	11.00	9.79	10.00 10974	
0.75	0.98	0.61	1.07	3.41	3.29	7.25	3.03	1.50	11.78	11.00	10.28	10.00 10798	
1.92	1.20	0.25	0.77	4.14	4.11	5.79	3.13	1.16	10.08	9.00	8.92	8.00 11100	
0.62	0.06	0.72	3.18	4.58	4.53	0.71	2.86	0.49	4.06	4.00	3.57	3.00 10975	
.....	0.53	0.29	0.54	1.36	1.23	7.90	2.83	0.36	11.09	11.00	10.73	10.00 10825	
1.01	0.37	0.21	0.50	2.09	2.46	6.74	3.61	0.51	10.86	11.00	10.35	10.00 10836	
2.18	0.08	1.08	1.03	4.37	4.10	0.81	5.68	1.52	8.01	7.00	6.49	6.00 11200	
1.35	0.49	0.40	0.64	2.88	2.87	7.99	2.23	0.59	10.81	11.00	10.22	10.00 10769	
.....	0.84	0.08	0.17	0.70	1.79	1.65	6.06	4.51	1.05	11.62	10.00	10.57	10.00 10761
2.64	0.13	0.14	2.20	5.11	4.95	3.79	1.71	0.59	6.09	4.00	5.50	4.00 10764	
3.21	0.13	0.65	5.29	9.28	9.06	1.94	2.37	0.45	4.76	3.00	4.31	3.00 11039	
1.20	0.09	0.23	1.08	2.60	2.45	6.02	3.43	0.68	10.13	8.00	9.45	8.00 10763	
0.96	0.06	0.10	3.36	4.48	4.11	1.65	2.66	0.37	4.68	3.00	4.31	3.00 11174	
0.91	0.05	0.17	3.30	4.43	4.11	1.55	1.85	0.35	3.75	3.00	3.40	3.00 10808	
.....	0.65	0.02	0.23	0.28	1.18	1.23	7.99	2.36	1.32	11.67	11.00	10.35	10.00 11111
1.09	0.58	0.47	0.77	2.91	2.87	7.02	3.70	0.55	11.27	11.00	10.72	10.00 10981	
1.20	0.35	0.42	0.65	2.62	2.46	6.56	3.97	1.09	11.62	11.00	10.53	10.00 10980	
.....	4.88	0.13	0.67	0.66	6.34	6.00	0.05	5.02	6.83	11.90	12.00	5.07	6.00 10722
0.84	0.21	0.51	0.88	2.44	2.50	2.96	6.54	5.16	14.66	12.00	9.50	10.00 10721	
1.37	0.02	0.15	0.28	1.82	1.62	3.87	2.68	1.75	8.30	7.50	6.55	7.00 10988	
1.92	0.10	0.52	0.86	3.40	3.30	4.91	6.46	5.03	16.40	13.50	11.37	12.50 10989	
2.49	0.16	1.09	1.31	5.05	5.00	2.04	8.50	4.59	15.13	13.00	10.54	10.00 11094	
0.84	0.31	0.35	2.53	4.03	4.12	0.09	2.73	3.85	6.67	4.00	2.82	3.00 10990	
0.76	0.09	0.07	0.37	1.29	1.00	3.94	3.48	1.93	9.35	8.00	7.42	7.50 10806	
1.21	0.19	0.09	0.76	2.25	2.00	6.35	6.53	4.03	16.91	15.00	12.88	14.00 10827	
.....	0.17	1.94	0.16	1.75	4.02	4.11	8.12	2.05	0.82	10.99	10.50	10.17	10.00 11095
0.08	0.64	0.42	0.75	1.89	1.65	6.35	3.43	1.15	10.93	8.50	9.78	8.00 10991	
.....	0.10	0.37	0.49	0.96	0.82	3.39	4.40	1.46	9.25	8.50	7.79	8.00 10762	
.....	1.12	0.48	0.99	2.59	2.47	4.95	3.28	1.47	9.70	8.50	8.23	8.00 11089	
0.11	2.04	0.21	1.49	3.85	3.29	8.35	1.84	0.75	10.94	10.50	10.19	10.00 11093	

TABLE II—NITROGENOUS SUPERPHOSPHATES.

Station No.	Manufacturer and Brand.	Place of Sampling.	Dealer's cash price per ton.
	<i>Sampled by Station:</i>		
	F. S. Royster Guano Co., Baltimore, Md. (Cont.)		
*11132	†Overland Top Dresser.....	Hazardville.....	\$60.00
†10819	Overland Top Dresser.....	Cheshire.....	57.00
11091	Penguin Ammoniated Superphosphate.....	Glastonbury.....	35.50
11123	Perfecto Tobacco Formula.....	New Milford.....	63.00
*10791	†Perfecto Tobacco Formula.....	Glastonbury.....	58.00
	Sanderson Fertilizer & Chemical Co., New Haven, Conn.		
11110	High Grade Ammoniated Phosphate.....	Westport.....	50.00
11138	High Grade Ammoniated Phosphate.....	East Hartford.....	49.00
10831	Phosphate without Potash.....	Shelton.....	41.00
10760	Special without Potash.....	Plainville.....	45.00
10996	Tobacco Grower 1916.....	Silver Lane.....	60.00
10719	Top Dressing for Grass and Grain without Potash 1916.....	Mt. Carmel.....	.....
	The C. M. Shay Co., Groton, Conn.		
‡11109	Shay's Formula 4-8.....	Groton.....	48.00
	M. L. Shoemaker & Co., Philadelphia, Pa.		
10766	Swift-Sure Superphosphate for Tobacco and General Use.....	Windsor Locks.....	55.00
	Springfield Rendering Co., Springfield, Mass.		
10839	Animal Fertilizer.....	Thompsonville.....	48.00
	Virginia-Carolina Chemical Co., New York City.		
11000	Ammoniated Bone Phosphate for All Crops.....	Simsbury.....	37.50
10999	H. G. Corn and Vegetable Compound without Potash.....	North Haven.....	45.00
10765	Indian Brand for Tobacco without Potash.....	Glastonbury.....	.....
11107	Tobacco and Onion Special.....	Glastonbury.....	.....
	Wilcox Fertilizer Co., Mystic, Conn.		
10837	Corn Special.....	Ellington.....	51.50
11004	Grain Fertilizer.....	Ellington.....	39.00
11002	Grass Fertilizer.....	Ellington.....	56.50
	Worcester Rendering Co., Auburn, Mass.		
11007	Royal Worcester Potato and Vegetable Fertilizer.....	Norwich.....	49.25
	<i>Sampled by Purchasers:</i>		
10680	Frisbie's Market Garden and Top Dresser.....	Branford:—The A. E. Plant Sons' Co.....	54.00
10679	Frisbie's Potato and Vegetable Grower.....	Branford:—The A. E. Plant Sons' Co.....	49.25
10662	Olds & Whipple's Complete Tobacco Special.....	West Suffield:—H. C. Nelson.....	.....

* See Note on page 138.

† See note on page 141.

‡ See table on page 140.

WITHOUT POTASH—(Concluded).

In Nitrates.	Nitrogen.					Phosphoric Acid.							Station No.
	In Ammonia.	Organic, water-soluble.	Organic, water-insoluble.	Total.	Found.	Guaranteed.	Water-soluble.	Citrate-soluble.	Citrate-insoluble.	Total.	Guaranteed.	So-called "Available."	
0.05	2.24	0.29	1.42	4.00	4.94	2.90	1.42	0.59	4.91	5.50	4.32	5.00	11132
...	1.95	0.66	1.84	4.45	4.94	5.16	3.56	1.51	10.23	5.50	8.72	5.00	10819
0.06	1.00	0.26	0.54	1.86	1.65	6.81	3.25	1.07	11.13	10.50	10.06	10.00	11091
0.21	0.89	0.40	2.62	4.12	4.11	1.94	2.32	0.58	4.84	4.50	4.26	4.00	11123
0.13	0.93	0.24	2.51	3.81	4.11	2.26	2.10	0.55	4.91	4.50	4.36	4.00	10791
1.20	0.12	0.52	1.35	3.19	3.29	6.52	4.01	1.07	11.60	11.00	10.53	10.00	11110
1.16	0.81	....	1.14	3.11	3.29	8.05	2.13	0.54	10.72	11.00	10.18	10.00	11138
0.47	0.10	0.58	0.58	1.73	1.65	4.54	5.47	1.61	11.62	11.00	10.01	10.00	10831
0.63	0.12	0.54	1.13	2.42	2.47	6.10	3.93	2.02	12.05	11.00	10.03	10.00	10760
1.04	0.05	0.17	3.01	4.27	4.53	0.98	2.96	0.51	4.45	4.00	3.94	3.00	10996
1.94	0.67	0.67	1.28	4.56	4.11	6.09	2.40	1.74	10.23	9.00	8.49	8.00	10719
0.85	0.06	0.90	1.41	3.22	3.29	6.01	3.85	1.27	11.13	11.00	9.86	10.00	11109
0.78	....	0.84	1.61	3.23	3.30	8.27	3.19	2.88	14.34	11.00	11.46	9.00	10766
1.12	0.04	0.81	0.46	2.43	2.46	7.76	4.13	1.07	12.96	11.00	11.89	10.00	10839
0.29	0.94	....	0.24	1.47	1.65	8.16	3.33	0.20	11.69	11.00	11.49	10.00	11000
0.16	1.83	0.06	0.46	2.51	2.47	7.70	2.81	0.40	10.91	11.00	10.51	10.00	10999
0.09	1.89	0.29	1.51	3.78	4.12	4.31	0.85	0.38	5.54	5.00	5.16	4.00	10765
0.34	2.42	....	0.62	3.38	3.29	5.42	2.68	1.34	9.44	9.00	8.10	8.00	11107
2.17	....	0.11	1.53	3.81	3.39	9.83	2.31	3.97	16.11	11.00	12.14	10.00	10837
0.82	0.02	0.05	0.94	1.83	1.65	8.79	2.73	0.24	11.76	11.00	11.52	10.00	11004
2.53	0.02	0.53	0.84	3.92	4.12	7.41	2.58	4.16	14.15	9.00	9.99	8.00	11002
0.48	0.42	0.66	1.14	2.70	3.29	7.35	4.89	3.30	15.54	11.00	12.24	10.00	11007
0.77	1.81	0.52	0.82	3.92	4.10	5.37	3.26	0.61	9.24	9.00	8.63	8.00	10680
1.22	0.22	1.06	0.97	3.47	3.29	6.02	4.39	2.32	12.73	11.00	10.41	10.00	10679
1.16	0.04	0.93	2.15	4.28	4.13	1.67	1.60	0.31	3.58	3.00	3.27	3.00	10662

VI. MISCELLANEOUS FERTILIZERS AND WASTE PRODUCTS.

SHEEP MANURE.

11126. Sheep Manure. Sold by Armour Fertilizer Works, Chrome, N. J. Stock of Chas. Templeton, Waterbury.

11217. Sheep Manure. Sold by Armour Fertilizer Works, Chrome, N. J. Stock of Quality Seed Store, Stamford.

10735. Magic Brand Ground Sheep Manure. Sold by Chicago Feed & Fertilizer Co., Chicago, Ill. Stock of F. S. Platt Co., New Haven.

11363. Sheep Manure. Sold by Mid-West Potash Co., Omaha, Neb. Sampled and sent by S. D. Woodruff & Sons, Orange.

10817. "Sheeps Head" Pulverized Sheep Manure. Sold by Natural Guano Co., Aurora, Ill. Stock of F. S. Bidwell & Co., Windsor Locks.

11278. Wizard Brand. Sold by F. S. Platt Co., New Haven. Sampled and sent by J. W. Anderson, West Haven.

10206. Wizard Brand. Sold by Pulverized Manure Co., Chicago, Ill. Stock of F. S. Platt Co., New Haven.

11350. Sheep Manure. Sold by E. J. Weckbach, Denver, Col. Sampled and sent by S. D. Woodruff & Sons, Orange.

11189. Sheep Manure. Brand unknown. Sampled and sent by Mrs. L. P. Wheeler, Westville.

10726. Sheep Manure. Brand unknown. Sampled and sent by M. H. Pratt, Hartford.

11126, from the Armour Fertilizer Works, failed to meet its guaranty in potash while the amounts of nitrogen and phosphoric acid considerably overran the guaranteed percentages. At the request of the Armour Works a second sample was drawn from a different lot, **11217**, which fully met the guaranty. Sheep manure cannot be expected to have a very uniform composition. Thus, in the 35 samples tested here in the last seven years, nitrogen has ranged from 1.0 per cent. to 2.74, phosphoric acid from 0.83 to 2.99, and water-soluble potash from 0.74 to 4.39 per cent. The *average* of all these analyses is

Nitrogen.....	2.09
Phosphoric acid.....	1.77
Water-soluble potash.....	2.43

ANALYSES OF SHEEP MANURE.

Station No.....	11126	11217	10735	11363	10817	11278	10206	11350	11189	10726
<i>Per cent. of</i>										
Nitrogen as nitrates.....	0.56	0.09	0.22	.....	.....	.....	0.10	.....	.....	.....
" as ammonia.....	0.36	0.01	0.07	.....	0.30	.....	0.10	.....	.....	.....
" as organic.....	1.30	1.45	1.29	.....	2.14	.....	1.84	.....	.....	.....
" total found.....	2.22	1.55	1.58	2.50	2.44	1.92	2.04	1.36	2.20	1.95
" total guaranteed..	1.65	1.65	1.85	.....	2.25	.....	1.80	.....	.....	.....
Phosphoric acid, water-soluble.....	0.45	0.04	0.09	.....	1.25	.....	0.38	.....	.....	.....
Phosphoric acid, citrate-soluble.....	1.55	1.19	0.67	.....	0.37	.....	1.68	.....	.....	.....
Phosphoric acid, citrate-insoluble.....	0.49	0.14	0.14	.....	0.20	.....	0.10	.....	.....	.....
Phosphoric acid total found.	2.49	1.37	0.90	.....	1.82	.....	2.16	.....	2.84	2.66
" " " total guaranteed.....	1.00	1.00	1.50	.....	1.25	.....	*	.....	.....	.....
Water-soluble potash found.	1.97	3.54	3.24	.....	2.07	.....	2.00	.....	1.36	.....
" " " guaranteed.....	3.25	3.25	1.25	.....	1.50	.....	1.00	.....	.....	.....
Chlorine.....	0.30	1.24	1.75	.....	0.58	.....	0.64	.....	.....	.....
Cost per ton.....	\$50.00	56.00	39.00	.....	45.00	.....	40.00	.....	.....	.....

* Guaranty 1 per cent. "available."

11363 and **11350**, sent by S. D. Woodruff & Sons, and **10726**, sent by M. H. Pratt, Hartford, contain 41.62, 69.59 and 46.43 per cent. of mineral matter, sand and soil, respectively.

Obviously, such stuff is unfit for transportation from the West to Connecticut.

While sheep manure may be used in some cases in place of horse manure, in greenhouse work and on small lawns, it cannot profitably be used in farm practice, at any such prices as are charged at present.

RABBIT MANURE.

11359. Rabbit Manure. Sent by P. B. Burnett, Falls Village. It contained 1.02 per cent. of nitrogen in ammonia, 2.68 per cent. total nitrogen, 0.90 per cent. phosphoric acid and 1.11 per cent. of potash.

BAT GUANO.

11450 and **11451**. Bat guano from the bat caves, Isle of Pines, sent by Kopf Bros., New Haven. Analyses were as follows:

	11450	11451
Moisture.....	5.14	2.66
Ash.....	22.98	14.94
Organic and volatile.....	71.88	82.40
Total nitrogen.....	0.76	0.14
Phosphoric acid.....	8.88	4.64
Potash.....	1.42	0.00

ASHES.

Twenty-one samples of wood or other ashes have been analyzed and are included in table, page 165.

9699 is ashes from brass works sent to determine their agricultural value.

9750 is ashes from witch hazel brush which had been extracted in a witch hazel factory and then burned under the boilers.

9749 and **11356** are from the same factory, but are mixtures of wood and coal ashes.

11199 and **10595** were sent to determine their quality, before purchase.

10678 and **10677** probably do not represent material offered for sale but were sent with inquiry as to their value.

Only the following samples were drawn by the sampling agent of the Station—**11139**, **11054**, **9750**, **9749**, **10615**, **10861**, **10897**. Of these only three, **9750**, **10615** and **10897**, can be classed as wood ashes of fair quality. A number of samples sent by individuals are also of good quality.

If we reckon lime as worth 50 cents per 100 lbs. and phosphoric acid at 6 cents, the water-soluble potash in **10861** cost about 35.6 cents per pound which at present potash quotations is not extraordinarily high.

LIME AND LIME-KILN ASHES.

9707. Slaked lime. Sold by the New England Lime Co., East Canaan. Sent by B. G. Southwick, Storrs.

11293. Lime. Sent by A. L. Chamberlain, New Haven.

9705 and **9706**. Lime Kiln Ashes made by the New England Lime Co., East Canaan. Sent by B. G. Southwick.

	9707	11293	9705	9706
Water-soluble potash.....	.....	.....	0.45	1.42
Lime.....	32.48	33.41	34.58	28.82
Magnesia.....	16.75	15.57	7.54	8.43

ANALYSES OF WOOD ASHES.

ASHES.

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Station No.	Car No. and Dealer or Purchaser.	Water.	Insoluble acid (sand).	Water-soluble potash.	Lime.	Phosphate.	Aged.	Cost per ton.
11139	Alphano Humus Co., New York.	29.00	6.82	1.70	31.80	1.31	\$18.00	
11054	M. M. Smith, Shaker Station.	30.97	1.52	26.62	1.93	24.00		
10675	Amer. Agr. Chem. Co., New York.	9.46	9.36	36.28	1.55			
9699	Benjamin Beets, Fairfield.							
9750	Bristol Brass Co., Bristol, Conn.							
9750	E. E. Dickinson & Co., Essex, Conn.							
9749	E. E. Dickinson & Co., Essex, Conn.							
11356	E. E. Dickinson & Co., Essex, Conn.							
10984	Car 44354. The Griffin Tobacco Co., Hartford.							
11199	The Griffin Tobacco Co., Hartford.							
11276	Thomas Griswold Co., South Wethersfield.							
10985	John Joynt, Lucknow, Ont.							
10541	The Griffin Tobacco Co., Hartford.	14.09	6.10	32.68	2.23			
10615	John Joynt, Lucknow, Ont.	16.30	4.88	30.59	2.17			
10861	Henry Fuller, Suffield.							
10897	Henry Fuller, Suffield.							
10678	Henry Hitchcock & George, Warehouse Point.							
10677	John Joynt, Lucknow, Ont.	45.56	1.33	10.81	0.68	26.00		
10623	Patrick F. O'Brien, Willimantic.	10.69	6.54	33.29	2.30	*		
9757	Olds & Whipple, Hartford.							
10815	Car 21159. L. Wetstone, Vernon.							
10595	Samuel H. Reid, Suffield.							
	Chas. Stevens, Napanee, Ont.							
	John B. Cannon, Granby.							
	Sterling Asbestos Co., Brooklyn, N. Y.							
	Barnes Brothers Nursery Co., Yalesville.							
		11.49	5.58	41.52	2.33			

*\$6.50 per unit of potash.
† Magnesia, 3.74.

MUCK, PEAT, HUMUS, ETC.

Five samples have been examined as follows:

9996, 9997 and 9998. Muck. Sent by A. B. Smith, Clintonville.

10516. Muck. Sent by Chas. Scheer, Kensington.

11342. Old deposit of vegetable matter underlying two feet of muck. Sent by E. Jay Teagarden, Danbury.

Station No.....	9996	9997	9998	10516	11342
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Composition as received:

Water.....	63.03	69.03	72.86	65.31	72.88
Mineral matter.....	6.36	14.86	9.42	2.77	18.49
Organic matter.....	30.61	16.11	17.72	31.92	8.63
Nitrogen.....	0.76	0.40	0.45	0.32	0.25
Phosphoric acid.....	0.01	trace	trace	*	*
Potash.....	0.03	0.01	0.02	*	trace

On water-free basis:

Mineral matter.....	17.20	47.98	34.71	7.99	68.18
Organic matter.....	82.80	52.02	65.29	92.01	31.82
Nitrogen.....	2.05	1.29	1.66	0.92	0.92
Phosphoric acid.....	0.03	.....	.....	.....	.....
Potash.....	0.08	0.03	0.07	.....	0.25

* Not determined.

The three samples having the highest per cent. of organic matter in their water-free state represent mucks which should have considerable value as absorbents in trenches and as material for composting with manure.

TOBACCO STEMS AND DUST.

Three samples were analyzed as follows:

10540. Tobacco Dust. Sent by Walter Mitchell, New Haven.

11434. Tobacco Dust. Sent by Morgan and Dickinson, Windsor.

9755. Tobacco Stems. Sent by the Shaker Farms, Enfield.

Station No.....	10540	11434	9755
Nitrogen.....	1.32	2.24	1.86
Phosphoric acid.....	0.28	0.81	0.26
Potash (total).....	1.62	3.09	3.55

LIME FERTILE AND NITRO-FERTILE.

These are two fertilizers made by the Fertile Chemical Co., Cleveland, Ohio, and entered for sale in this state. Their analyses follow:

11172. Nitro-Fertile, sent by the manufacturer.
11182. The same brand sent by the James Swan Co., Seymour.
10579. Lime-Fertile. Sent by the manufacturer.
10896. The same brand. Sampled from stock of A. R. Brewer, Hartford.

	11172	11182	10579	10896
Nitrogen as nitrates.....	2.36	2.24	....	....
Total nitrogen.....	2.36	2.24	0.02	....
Phosphoric acid.....	3.39	3.21	3.48	3.35
Water-soluble potash.....	4.26	4.04	0.05	....
Lime.....	....	....	42.14	....
Magnesia.....	....	....	8.80	....

Both materials are sold in small packages for household and greenhouse use.

MISCELLANEOUS MATERIALS.

10526. "Dust." Sent by D. H. Morgan, Southport, and stated to be a commercial product selling for \$10.00 per ton.
11140. "Blower Dust." Sold by the Berkshire Fertilizer Co., Bridgeport. Sampled by Station Agent from stock of W. N. Pinney, Rockville. Price \$37.50 per ton.

ANALYSES.	10526	11140
Total nitrogen.....	2.65	4.51
Phosphoric acid.....	1.02	10.13
Potash.....	1.03	0.40

9694. Marine Mud. Sent by J. W. Clark. Taken from the mouth of Oyster River, in Branford. It was asked whether the material had sufficient agricultural value to make it worth handling. It contained 54.11 per cent. of water and 41.02 per cent. of mineral matter, 0.16 of nitrogen and 0.08 of phosphoric acid. Obviously, material like this which contains 95 per cent. of valueless material cannot be profitably handled.

10841. Alphano Humus. Sent by Edith L. Gilbert, Kent, asking if it is as advertised in Ross Brothers Catalogue, a copy of which was sent with it.

It is there stated to be "a perfectly balanced soil ration that unfailingly produces immediate and long enduring fertility."

"The potash it contains alone is worth the price." The price quoted is \$20.00 per ton.

It contained 2.21 per cent. of nitrogen, 1.16 of phosphoric acid and 0.08 per cent. of potash.

At current prices "the potash it contains alone is worth" about 56 cents.

In respect of the claim as to potash it is, therefore, not at all as advertised by the seller. His claim may not, however, be the same as that of the manufacturer.

10609 is a mixture of hen manure and acid phosphate, sent by W. N. Peck, Mt. Carmel.

10887 is soil from an old hen yard mixed with some ground limestone, sent by F. H. Saxton, Bristol.

ANALYSES.	10609	10887
Nitrogen as ammonia.....	0.21	....
Organic.....	1.20	....
Total.....	1.41	0.32
Phosphoric acid.....	5.64	0.58
Water-soluble potash.....	0.39	0.09

10697. Tea and Coffee Waste. A sample of material which had been exhausted in the preparation of caffeine, sent by J. Carle & Sons, 153 Water St., New York., contained about 50 per cent. of water. It also contained 1.16 per cent. of nitrogen, 0.26 phosphoric acid and 0.31 per cent. of total potash.

10003. Copper in Horse Manure. Horse manure sent by C. M. Jarvis, Berlin, who reported that it did not heat readily. Sawdust had been used for litter in the stable from which the manure was bought. Copper was found in the manure which suggested that the stable had used for bedding sawdust from a factory where brass parts were cleaned by mixing sawdust with them in a tumbling barrel.

9747. "Potash from Feldspar." Feldspar treated in a furnace with magnesian limestone, coal dust and peat.

It contained 0.20 per cent. of nitrogen and 0.21 per cent. of potash soluble in acid. The treatment has obviously been of no marked effect in making the potash soluble.

10951. Treated Garbage. A sample of garbage specially treated to promote bacterial action. From Prof. S. C. Prescott, Mass. Institute of Technology.

11267. Sample from the Bridgeport Garbage disposal plant, sent by J. S. Holmes, Bridgeport.

	10951	11267
Nitrogen.....	0.85	1.00
Phosphoric acid.....	1.19	1.64
Potash.....	0.40	0.07
Insoluble in acid.....	56.32	....

The Bridgeport garbage contained

Water.....	30.35
Organic and volatile.....	22.86
Mineral matter.....	46.79
	<hr/>
	100.00

OTHER MISCELLANEOUS SAMPLES.

Fifty samples of soil have been tested for lime requirement, and ten samples of various materials which seem to have no general interest are not further noticed in this report.

REGARDING THE CHEMICAL ANALYSIS OF SOILS.

The Station is constantly receiving samples of soil, ranging in size from a few teaspoonsful to a pint or more, taken from a garden or a particular field. The senders usually ask for an analysis which will show what elements of plant food are deficient or lacking in the soil, or they wish to know what crops can be most successfully grown on it. Analyses of such samples cannot furnish the information which is asked for.

Chemical analysis does not as a rule show with definiteness what a particular soil needs in the way of plant food to make it productive. An analysis shows the kind and quantity of the elements which are in a soil, but cannot show what elements and how much of them are readily available to crops. It is just this information, however, which we need.

With the rarest exceptions, our soils contain every element of plant food and in amount sufficient to produce many crops. Sometimes this food is not in sufficiently available form, but more often, other conditions prevent the crop from utilizing it. There may, moreover, be sufficient available plant food for some crops and not enough for others.

Experience teaches that the mechanical condition of the soil, its water-supply and water-holding capacity, its drainage, temperature

and aeration more largely affect the success of a crop than the chemicals or fertilizers added at planting time.

The good effects of stable manure, which are out of all proportion to the amount of plant food in it, are due in part to its effect on the other factors of fertility which have just been named.

If a soil is not sufficiently underdrained, if its mechanical condition is either too open or too close, or if it is not adapted to the particular crop which is being raised upon it, then it will not yield satisfactorily, no matter what fertilizers are applied to it. But on all these points a chemical analysis gives no information.

The trouble with many soils which give unsatisfactory returns being their physical condition rather than their chemical composition, it is as hopeless to search for the trouble by chemical analysis as it would be to try to determine why a man was unwell by a chemical analysis of a part of his body. If a soil is not sour, if it has the right texture, if it contains sufficient water and is not exposed to drought, if the weather conditions are favorable and the tillage is properly managed, then in most cases here in Connecticut fertilizers will give an increased yield, but if the conditions just mentioned are unfavorable, no amount of fertilizer will increase the crop.

The first thing to consider, if a soil is unproductive, is the water supply, which may be improved by irrigation, by thorough and intelligent tillage, and also by the increase of humus, which is to be secured from manure or by green manuring. Next, the probable need of lime should be regarded, and with it should always go more attention to increase of humus.

When all other factors of fertility have been made as favorable as possible, then and not till then should the question of the use of chemical fertilizers be considered.

Whether a soil is relatively deficient in quickly available potash, nitrogen, or other element of plant food, can best be determined by actual experiments made with the different forms of plant food on the land itself. Regarding such experiments this Station is prepared to offer suggestions to any who are willing to undertake them. This deficiency in available plant food cannot be determined by any chemical laboratory tests at present known.

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